

INTRODUCTION

The study has been conducted with the main purpose of developing a programmed text on 'Educational Evaluation' which can be utilised as instructional material for the B.Ed. students of the M.S. University of Baroda. Details regarding the nature of the Programmed Text developed and details of the procedures adopted in its development have been given in Volume I of the thesis. The Programmed Text in its final form is given in the present volume along with the criterion tests.

As has been already described in Volume I of the thesis, in order to validate the Programmed Text, an experiment has been conducted comparing the effectiveness of the Programmed Text with that of structured lectures. For structuring the lectures so that the comparison becomes meaningful, six booklets have been developed corresponding to the six units of the course. These six booklets which have been used as learning material for students in the lecture group are presented in the present volume.

EDUCATIONAL EVALUATION

A Programmed Text

About this learning material

1. Using this learning material 'programme' you can learn all that you need to know about 'educational evaluation and measurement'. The material has been divided into six units :

- I Educational evaluation and measurement - A
- II Educational evaluation and measurement - B
- III Characteristics of a good instrument of evaluation.
- IV Major tools and their uses.
- V Achievement tests.
- VI Elementary statistics in education.

All these topics are dealt with mainly in the context of school education.

2. You may think that this is just another text-book on 'educational evaluation'. No, it is not just a text-book.

— By reading this programme, carefully, you learn about 'educational evaluation' yourself. You do not require a teacher to teach you.

— As every one of you have a copy of the programme, you would read and learn at your own speed.

— When a teacher teaches you or when you try to learn by reading textbooks, it is possible that after much has been covered you realise that you have not understood anything. But, such a situation never arises in this programme as after each step you come to know whether you have understood the point or not.

3. The programme contains a number of small units called 'frames'. Each frame presents some information and includes a question which you are to answer. The correct answer to each question is given immediately below it.

4. Although there are questions and answers the programme is 'not a test'. Through questions and answers the material has been organised in logical steps so that it is easy for you to learn by yourself.

How to learn using this programme

1. Read the programme at your own speed.
2. You will find that the frames are presented between two horizontal lines. Read each frame carefully and thoroughly so that you properly understand the question asked in it.
3. While reading the programme, you will come across certain word or words underlined. Study these words carefully as they may help you in answering the questions that come afterwards.
4. For the question given in each frame write your answer in the answer sheet. Do not write anything in the programme.
5. Your answers should be brief and to the point.
6. Since you have to answer a question in every frame you would naturally be interested in knowing whether your answer is correct or not. Therefore, the correct answer is given immediately below each frame. You should keep the correct answer covered with the card provided for this purpose until you have written your own answer to the frame in the answer sheet.
7. After writing your answer, you move the card and compare your answer with the correct answer. You will find that you are right almost all the time. If your answer is wrong, read the frame again and understand why you are wrong; and, then go to the next frame.

Now you may turn over the page and start reading the programme.

I. Educational Evaluation and Measurement - A

Of course, education and evaluation are by themselves not new to you. You may already know something about them. But, you may be wondering what it would mean when the two terms are put together and called educational evaluation. So, we would first try to answer the question :

--- What is educational evaluation?

Once you get the answer to this question, you will also come to know that educational evaluation refers to a 'process' carried out in schools. As a process, it should obviously involve several steps. Therefore, we shall next answer the question :

--- What are the steps involved in the process of educational evaluation?

You will also come to note that educational evaluation involves assessing pupils as a part of regular school work. You may be thinking that what is it that we evaluate in pupils; and, also, if evaluation is a part of school work when is it carried out. Because, at schools pupils study, play, mix with other pupils and do various other activities. Also, school work goes on as a daily routine from morning till evening through out the year. Therefore, in this regard we shall try to answer two questions :

--- When do we evaluate pupils?

--- What do we evaluate in pupils?

With all these questions answered you may still be wondering why should this process of evaluation be carried out in school at all. Thus, lastly we would obtain answer to the question :

--- What are the uses of educational evaluation?

All of us have attended schools and we know about the different activities that generally go on in a school. 'Educational Evaluation' is an integral part of school activities. Therefore, you must already know something about it.

Can you tell what 'educational evaluation' is?

Perhaps cannot. Because, the terms 'education' and 'evaluation' are new to you. But proceed further and you will find that you certainly know fairly well about the two terms.

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1. We may say that we attended schools because our parents sent us to attend schools.

But why do parents send their children to schools?

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar in meaning to the following.

Parents send their children to schools because schools provide education to the children.

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2. Thus, 'education' is something that is provided to children at schools. We may also say that the purpose of a school is to provide education to children.

Recall your school experiences and answer the following.

What is done in the schools in order to provide education?

(Write your answer in brief in the answer sheet)

You are right if your answer is similar in meaning to the following.

Various activities like classroom instruction and laboratory training in various subjects, games, sports and such other group activities,

extra-curricular activities like science club, debates, dramatics, etc. are organised in the schools in order to provide education to children.

Therefore, the purpose of all these different activities taken together is to provide education to the children.

Let us recall our school experiences and consider certain activities of the school individually to see why they are organised.

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3. Your history teacher taught you in detail about Moghul Kings who ruled over India.

Why did he teach you this topic?

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar in meaning to the following.

Your teacher taught you about Moghul rulers in India because he wanted you to learn certain important dates, names and events related to Moghul rule in India.

Thus, teaching in history was done with certain purposes or objectives specifying what the students should learn.

4. Your teacher taught you various topics in arithmetic starting from addition, subtraction, multiplication and division of numbers.

Why were all these topics taught?

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar in meaning to the following.

These topics were taught so that you could learn to solve arithmetical problems.

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5. Again, we may say that teaching in Arithmetic was done with certain objectives specifying _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : what the students should learn

6. You were taught different languages in the school so that you could learn to express your ideas and also understand those of others.

Therefore, we can say that language teaching was done in the school with certain _____ specifying what the students should learn.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : objectives

7. You participated in various group activities wherein you were required to work with other students.

Why were you made to participate in group activities?

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar in meaning to the following.

You were made to participate in group activities with the objective that you learn to work with others in a group.

Thus, from the above instances, you find that every activity in the school is organised with certain objectives specifying what the students should learn.

8. In the above we have noted two points

- (i) Various activities are organised in schools with certain specific _____.
- (ii) These objectives specify what the students are expected to _____ through the various activities.

(Write the missing words in the above sentences in the answer sheet)

The correct answer is : (i) objectives
(ii) learn

9. Thus, we have that various activities are organised in schools with specific objectives. Also we noted earlier that various activities are organised in schools with the purpose of providing education.

We may, therefore, say that these specific objectives together form the _____ of school education.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : purpose

10. We have noted that the specific objectives of various activities in school together form the purpose of education. Accordingly, these specific objectives are called _____al objectives.

(Write the missing word in the above sentence in your answer sheet)

The correct answer is : educational

11. We may, therefore, say that various activities like teaching, laboratory work, physical education, extra-curricular

activities, etc. are organised in school in order to achieve educational _____.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : objectives

It's fine! We have learnt that various activities are organised in schools for achieving educational objectives. Now, let us consider one such activity carried out with a specific objective.

12. Suppose your teacher has taught about density of materials with the objective that all students learn the meaning of density.

Can he always be sure that the objective has been achieved, i.e. all students have learnt the meaning of density?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : No

13. You are right. The teacher cannot be sure unless he checks whether the objective has been achieved or not. In other words, the teacher has to determine whether students have learnt what is specified in the educational _____.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : objective

14. Suppose the teacher is trying to check whether the educational objectives have been achieved.

Complete the following sentence by choosing the proper alternative from those given thereafter.

Teacher would find that

- (i) all objectives have been achieved completely.
- (ii) different objectives have been achieved to different extents.

(Indicate your answer by writing (i) or (ii) in the answer sheet)

The correct answer is : (ii)

Obviously, the teacher would find that certain objectives have been achieved completely and certain others only partly. In other words, students would have learnt certain points completely and certain other points only partly.

15. Thus, educational objectives are achieved through various activities in schools to different extents.

Therefore, while checking whether educational objectives have been achieved or not, we have to actually determine the _____ to which they have been achieved.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : extent

16. We may say that we organise various activities in schools to achieve specific educational objectives.

And, then, we determine the _____ to which these educational _____ have been achieved.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : extent; objectives

17. In schools, activities would be organised continuously with specific objectives. And, with respect to each objective

we have to determine the extent to which it is achieved. Thus, this process of determining the extent to which educational objectives have been achieved is an integral part of school activities. And, this process, in fact, is called evaluation in education.

We may, therefore, state that the process of determining the extent to which educational objectives have been achieved is called educational _____.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : evaluation

18. Or, in other words, we may say that educational evaluation is the process of determining the _____ to which _____ have been achieved.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : extent; educational objectives

19. When we started reading this programme we did not know the meaning of the term 'educational evaluation'. But, now, we can confidently answer the question "What is educational evaluation?"

The answer would be that the process of determining the extent to which educational objectives have been achieved is called _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : educational evaluation

20. In other words we may say that we have arrived at a "definition of Educational Evaluation".

We may state the definition as "Educational Evaluation is the process of
....."

(Write the missing part in the above definition in the answer sheet)

The correct answer is : Educational Evaluation is the process of determining the extent to which educational objectives have been achieved.

From the above definition of educational evaluation it is clear that in order to understand the details involved in the process of educational evaluation we have to first know, in detail, about "educational objectives" and the meaning of "achieving educational objectives".

Therefore, let us try to learn in greater detail about educational objectives.

We noted that educational objectives specify why various activities are organised in school. Let us, therefore, take up certain school situations and see what happens to children when they participate in particular activities organised in school. This would tell us what is it to achieve educational objectives.

21. A boy when he joined the school in std.I could not tell his friend how much money he had in his pocket. But when he came to std.II he could count and specify the amount of money with him.

Let us see what has happened to the boy since he joined the school. Can we say that certain changes have taken place in the boy?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : Yes

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22. Earlier the boy could not count the money with him. But, change took place in him so that later he could count and add in order to specify the amount of money with him.

What changes in the boy does this represent?

(Write your answer in one sentence in the answer sheet)

You are right if your answer is :

This represents changes in the boy's ability to count and add.

23. Referring to the above changes we may also say that desirable changes were brought about in the boy's computational skills.

How were these desirable changes in skills brought about?

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar in meaning to the following.

These desirable changes in skills were brought about through the instruction provided in the school.

From this, we may say that instruction was provided in the school with the objective of bringing about desirable changes in skills.

24. Since his childhood, Lakshman used to wonder why a big and heavy log of wood could float on water, whereas even a small piece of stone would sink down. The reason became clear to him when his science teacher taught about 'density of materials'.

Thus certain changes took place in Lakshman. What changes in him does the above situation represent?

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar in meaning to the following.

The above situation represents desirable changes in his knowledge and understanding of scientific facts and phenomena.

25. Thus desirable changes were brought about in Lakshman's knowledge and understanding.

How were these desirable changes in knowledge and understanding brought about?

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar in meaning to the following.

Instruction was provided in the school in order to bring about these desirable changes in knowledge and understanding.

In other words, instruction was provided in the school with the objective of bringing about desirable changes in knowledge and understanding.

26. Raj when he joined the high school had weak physique and poor health. On the advice of his teachers, he started participating in games, sports, physical training classes and such other activities organised in the school, regularly. Within a year, he found himself quite strong and healthy.

Thus, desirable changes in his physical abilities were brought about at the school.

What was done in the school to bring about these changes?

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar in meaning to the following.

Games, sports and such other activities were organised in the school to bring about desirable changes in his physical abilities.

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27. Thus we may say that games, sports, etc. were organised in the school with the objective of bringing about changes in _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : physical abilities

28. Usha was a problem child for her parents as she frequently got into temper tantrums. She was admitted to a nursery school. Even at the school, she could not adjust herself to other children and used to quarrel with them. However, her teachers tried to understand her. Slowly, they made her mix with other children of her own age and also made her observe the behaviour of other children in different situations. As a result, within a few months, Usha's parents found her manageable.

Thus, desirable changes were brought about in her emotional and social adjustments by organising suitable experiences and activities in the school.

In other words, certain activities were organised in the school with the objective of bringing about desirable changes in

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : emotional and social adjustments

29. Nutan, after attending classes in Fine Arts for several years, has been able to sing and appreciate music. She has also developed great interest in painting and sculpture.

Thus desirable changes were brought about in her _____ and _____ by providing suitable activities.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : appreciations; interests

30. From the above, we may say that suitable activities were provided with the _____ of bringing about changes in _____ and _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : objective; appreciations; interests

31. From the above analysis of different school situations we find that various activities are organised in the school with specific objectives.

What are the objectives with which various activities are organised in the school?

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar in meaning to the following.

Various activities are organised with the objective of bringing about desirable changes in students' knowledge, understanding, skills, interests, attitudes, appreciations, adjustments and also physical abilities, etc.

32. Thus objectives of various activities in the school specify the desirable changes to be brought about in students' knowledge, understandings, skills, etc.

We noted earlier that objectives of various activities organised in the school are called 'educational objectives'.

Therefore, we can say that educational objectives are specifications of

(Write the missing part in the above sentence in the answer sheet)

The correct answer is : desirable changes to be brought about in students' knowledge, understandings, skills, attitudes, interests, appreciations and adjustments.

33. In terms of the definition of 'educational objectives' given above, answer the following.

What is it 'to achieve educational objectives'?

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar in meaning to the following.

To achieve educational objectives is to bring about desirable changes in students' knowledge, understandings, skills, etc.

34. Various activities are conducted in order to bring about changes in students' knowledge, understandings, etc.

Thus, what happens to the students when they participate in various activities?

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar in meaning to the following.

Changes take place in students' knowledge, understandings, etc.

35. We may say that the changes that take place in the students are the outcomes of various activities organised in the school.

But, if you remember, we have already noted that learning takes place in the students when they participate in various activities.

Combining the above two statements we may say that the changes that take place in students' knowledge, understandings, etc., are _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : learning outcomes

36. Learning takes place in the students when they participate in the various activities.

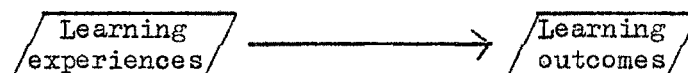
In other words, various activities are organised in the school to provide suitable experiences so that learning takes place in the students.

Thus we may call the various activities organised in the schools _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : learning experiences

37. Thus, learning outcomes are the results of learning experiences. We may represent this relationship by the following figure :



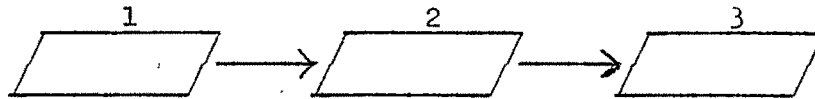
Also, different learning experiences are provided in order to achieve different educational objectives. In other words, on the basis of the specific objectives to be achieved we choose to provide particular learning experiences.

Again, we may represent this relationship by the following figure :



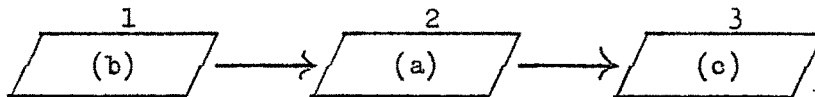
Observe the above two figures and fill in the blocks in the following figure in proper order with the terms :

- (a) learning experiences, (b) educational objectives,
(c) learning outcomes.



(Indicate your answer by inserting (a), (b), (c) in proper blocks in the figure given in the answer sheet)

The correct answer is :



38. Consider the school situation where educational objectives have been specified, appropriate learning experiences have been provided and also learning outcomes have been determined.

Here, educational objectives specify the changes that are expected in the students. Also, we have noted that changes that take place in students are referred to as _____ outcomes.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : learning

39. Therefore, combining what we noted above about educational objectives and learning outcomes, we may say that educational objectives are _____ outcomes.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : expected learning

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40. We, earlier stated that 'to achieve educational objectives is to bring about changes in the students.' But, from Frame 39, it is clear that 'changes in the students are referred to as expected learning outcomes'.

Therefore, in terms of learning outcomes, we may state that 'to achieve educational objectives' is 'to see that the actual learning outcomes correspond to all the _____ learning outcomes'.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : expected

41. Thus, in educational evaluation we find out what the students have actually learnt, i.e. _____ learning outcomes. On the other hand, we will be having the educational objectives specifying what the students are expected to learn, i.e. _____ learning outcomes.

(Write the missing words in the above sentences in the answer sheet)

The correct answer is : actual; expected

42. And, in order to check whether educational objectives have been achieved or not we compare actual _____ with expected learning outcomes, i.e. with educational _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : learning outcomes; objectives

But, a question that arises is "How to find out the actual learning in students?" Because, for comparing learning outcomes with

educational objectives we have to first of all, know the actual learning outcomes. In other words, we have to first answer the question, "What procedure should be followed in determining the actual learning outcomes?"

Again we shall try to answer this question by considering certain specific school situations which we have come across during our school years.

43. Suppose you are in a physics class in your school. Your teacher is teaching about 'density of materials'. After explaining about the meaning of density, your teacher wants to check whether the students have learnt the point. That is, he wants to find out the 'learning outcome'.

What does he do?

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar to :

He asks the boys a question on the meaning of density.

Thus the teacher determines the learning outcomes through the technique of questioning.

44. Over several periods, the teacher has taught the students in detail about all the Moghul rulers in India. And now he wants to check the knowledge of the students about Moghul rulers in India.

What does the teacher do to check the knowledge of the students?

(Write your answer in one sentence in the answer sheet)

The correct answer is :

The teacher gives the students a test consisting of questions related to Moghul rulers in India.

Thus, the teacher determines the learning outcome through the technique of testing.

45. . You have been trained to handle different measuring instruments in the chemistry laboratory. Now your teacher wants to check your skill in measuring a liquid with the help of a burette. How should he proceed?

Following are the possible answers to this question.

(a) He should allow you to measure a liquid using a burette and observe as you do it.

(b) He should ask questions about using a burette.

(Indicate your answer by writing (a) or (b) in the answer sheet)

If your answer is (a), you are right. You are wrong if your answer is (b) because, by your answer to the question teacher can only check your knowledge about using a burette. But it does not help him check your skill in using a burette.

Thus, your teacher selected the technique of observation. Then he used that technique to determine the learning outcomes.

46. Your teacher has often been stressing the importance of being cooperative while working in a group. He wants to know to what extent students cooperate with one another while working together.

What should the teacher do to obtain this information?

Following are two possible answers to the question.

- (1) Teacher should ask students to write an essay on the importance of cooperation.
- (2) Teacher should observe the behaviour of students when they participate in group activities.

(Indicate your answer by writing (1) or (2) in the answer sheet)

The correct answer is : (2). You are wrong, if your answer is (1) because from the essays written by students teacher can only know their knowledge about the importance of cooperation and they do not give him information as to the extent to which students really cooperate with one another.

Again, your teacher selected the suitable technique, then he used that technique to determine the learning outcomes.

47. In each of the above instances we found that in order to determine the learning outcomes the teacher used a particular technique such as _____, _____ and _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : oral questioning; testing; observation

The techniques which are used to determine the learning outcomes are called techniques of evaluation.

48. Read the instances presented in Frames 44 and 45.

Did the teacher choose the particular technique of evaluation on certain specific basis?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : 'Yes'

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49. The teacher selected the particular techniques on certain basis.

On what basis did the teacher select the particular techniques?

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar to :

Particular techniques were selected on the basis of the objectives with reference to which learning outcomes were to be determined.

For example, in the instance presented in Frame 44, objective in reference is a skill objective and naturally it is only by observing the students at actual performance one can determine the corresponding learning outcome.

50. Therefore, teacher has to first select suitable _____
_____ on the basis of the objectives to be evaluated.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : evaluation technique

51. After selecting the evaluation technique suitable for the objectives to be evaluated, teacher _____ the technique and determines the learning outcomes.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : uses

52. Studying the information presented in Frames 50 and 51, we may conclude that the procedure to be followed in determining

learning outcomes involves two specific steps. The two specific steps are

- (i)
- (ii)

(Write your answer in the answer sheet specifying each step by one sentence)

The correct answer is :

- (i) Select the evaluation technique.
- (ii) Use the evaluation technique to determine the learning outcomes.

53. We may also say that the first two specific steps in the process of educational evaluation are

- (i)
- (ii)

(Complete the above sentence by specifying the two steps in the answer sheet)

The correct answer is :

- (i) Select the evaluation technique suitable for the educational objectives in consideration.
- (ii) Use the technique to determine the learning outcomes.

54. In order to complete the process of evaluation, after determining the learning outcomes, we have to compare the learning outcomes with the educational objectives.

Before going on to the comparison, recall the definition of educational evaluation and answer the following question.

Why do we compare the learning outcomes with the educational objectives?

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar in meaning to the following.

We compare the learning outcomes with the educational objectives in order to determine the extent to which educational objectives have been achieved.

55. We know that both learning outcomes and educational objectives represent learning. In fact, learning outcomes represent the actual amount of learning while educational objectives represent the expected amount of learning. Since we have to determine the extent of achievement of the objectives, it will be more accurate if we measure the learning outcome (actual amount of learning) before comparing it with educational objectives (expected amount of learning).

Therefore, to be specific and accurate in our evaluation, we should _____ the learning outcomes.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : measure

56. We may, therefore, say that the third specific step in the process of educational evaluation is to _____ the learning outcomes.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : measure

57. Thus, we have noted the first three specific steps in the process of educational evaluation. These three steps are :

- (i)
- (ii)
- (iii)

(Complete the above sentence by specifying the three steps in the answer sheet)

The correct answer is :

- (i) select the evaluation technique suitable for the educational objective in consideration,
 - (ii) use the technique to determine the learning outcomes,
 - (iii) measure the learning outcomes.
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58. We also know that after measuring the learning outcomes, we have to _____ them with educational objectives to determine the extent to which educational objectives have been achieved.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : compare

59. Thus, the fourth step in the process of educational evaluation will be to

- (iv) _____ the learning outcomes with educational objectives to determine the extent to which educational objectives have been achieved.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : compare

60. We have noted that in the fourth step of the evaluation process we compare the learning outcomes with the educational objectives in order to determine the _____ to which educational objectives have been achieved.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : extent

61. We have also noted that different objectives would be achieved by different students to different extents - some of them fully and some of others only partly.

Can we say that all the objectives would be achieved to a satisfactory extent?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : No

62. Some objectives might be achieved to a satisfactory extent while others might not be. Therefore, after we compare the learning outcomes with the objectives and determine the extent to which the objectives have been achieved. We would judge to see whether the objectives have been achieved satisfactorily or not.

We may, therefore, say that after determining the extent to which educational objectives have been achieved, we _____ whether the extent of achievement of objectives is satisfactory or not.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : judge

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63. Thus, we have arrived at the fifth and final step in the process of evaluation. It is to _____ whether the extents to which various objectives have been achieved are satisfactory or not.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : judge

64. In frame 59 we have stated the fourth step in the evaluation process. Now we may say that the fourth and the fifth steps in the process of educational evaluation are :

(iv)

(v)

(Specify each step in one sentence in the answer sheet)

The correct answer is :

(iv) Compare the learning outcomes with educational objectives to determine the extent to which educational objectives have been achieved.

(v) Judge whether the extents to which various objectives have been achieved are satisfactory or not.

65. We have, therefore, learnt that educational evaluation as a process involves five specific steps. These five steps are :

(i)

(ii)

(iii)

(iv)

(v)

(Specify each step in one sentence in the answer sheet)

The correct answer is :

- (i) Select the evaluation technique for the educational objectives in consideration.
 - (ii) Use the technique to determine the learning outcomes.
 - (iii) Measure the learning outcomes.
 - (iv) Compare the learning outcomes with the educational objectives to determine the extent of achievement of the objectives.
 - (v) Judge whether the extent of achievement of objectives is satisfactory or not.
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66. You are given the following set of terms to represent the different steps in the process of educational evaluation :

- (a) Select the technique
- (b) Compare
- (c) Judge : Satisfactory or not
- (d) Determine the outcomes
- (e) Measure the outcomes

Arrange these terms in the proper order such that they represent the process of evaluation.

(Indicate your answer in the answer sheet by arranging (a), (b), (c), etc. in the proper order)

The correct answer is : (a), (d), (e), (b), (c).

We have understood the meaning of 'educational evaluation' and we have also noted the five specific steps involved in the process of educational evaluation. While learning these points we found that evaluation is an important activity that goes on in the school.

Now, let us see when this activity of evaluation is carried out in the school. In other words, we will answer the question :
When are pupils evaluated?

67. We have learnt that in order to educate children at the school

1. educational objectives are specified
2. appropriate learning experiences are provided for achieving the specified objectives
3. pupils are evaluated to check whether the objectives have been satisfactorily achieved or not.

This description somewhat gives the idea that evaluation is always done at the end, i.e. after specifying the objectives and providing suitable learning experiences.

Do you agree that evaluation is always done at the end?

(Write 'Yes' or 'No' in the answer sheet)

You are right, if your answer is 'No'.

Of course, evaluation is done at the end but not only at the end.

You may be wondering how evaluation can come before specifying the objectives or before providing the learning experiences. Do not worry. Proceed further and you will find the fact for yourself.

68. Recall certain instances of evaluation you have experienced during your school years such as your teacher's questioning while teaching, periodical testing in different subjects, final examination at the end of the year, etc. and answer the following question.

When is evaluation done?

Following are the possible answers.

- (i) at the beginning, i.e., before specifying the objectives.
- (ii) while providing the learning experiences.
- (iii) at the end, i.e. after specifying the objectives and providing the suitable learning experiences.
- (iv) at all the above stages.

(Indicate your answer by writing (i), (ii), (iii) or (iv) in the answer sheet)

The correct answer is : (iv). Of course, you are right even if you have written one of (i), (ii) and (iii). But, the answer is only partial. Because, evaluation is done at different stages depending upon the purpose and the situation.

May be, still, you are not convinced.

We shall consider certain specific instances.

69. You are all familiar with the final examinations that are conducted at the end of every year. You also know that it is an instance of evaluation.

This is an instance of evaluation of pupils which comes

-----.

- (i) at the end, i.e. after stating the objectives and providing learning experiences.
- (ii) at the beginning, i.e. before stating the objectives.
- (iii) while providing the learning experiences.

(Indicate your answer by writing (i), (ii) or (iii) in the answer sheet)

You are correct if your answer is (i) or (ii)

70. Again, you might have been surprised at the above answer. You were almost sure that examination can only be considered as an instance of evaluation coming at the end.

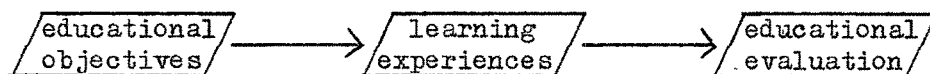
But, what do we evaluate through the final examination?

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar to :

We evaluate the pupils to see the extent to which each of them has achieved the objectives specified for that year.

Thus, we may say that final examination is an instance of evaluation that comes at the end. This situation may be represented by the following figure.



71. We shall, now look at the same instance from a different point.

Suppose you have just come to std.X after completing std.IX. But, you find that some boys who were with you in std.IX have been made to stay back there only.

On what basis are you allowed to go to std.X while some others are not allowed?

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar in meaning to the following.

You are promoted to std.X because you have passed the final examination in std.IX while those remaining at std.IX have failed in the examination.

In other words we may say that promotions of the students are decided on the basis of the evaluation done through the final examination.

72. Consider two students A and B. A has been promoted to std.X while B remains in std.IX. Thus, A learns new things while B learns the same things which he had been taught during the previous year.

Can we say that A has to achieve a new set of objectives while B continues with the same?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : Yes

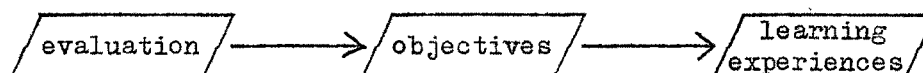
73. Since 'A' moves to the next class, naturally, a new set of objectives are set for him to achieve.

And, as we earlier noted, this decision about what objectives the different students should follow is taken on the basis of the _____ done through the final examination.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : evaluation

74. Thus, objectives to be achieved are specified on the basis of evaluation; and different learning experiences are provided accordingly. We may represent the above situation by the following figure.



Can we say that in this instance evaluation comes at the beginning, i.e., before setting the objectives?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : Yes

Obviously, from the above two instances, we find that evaluation comes not only at the end. It comes also at the beginning as what course of objectives a student should follow is decided only after evaluation.

75. Consider another common situation involving evaluation.

Your teacher started the lesson with the objectives that after his teaching (i) students recognise the cause and effect relationship between heating an object (solid) and its size (ii) students give two illustrations from their daily life experiences where expansion of solids is involved. After teaching about the effect of heating on the size of an object (i.e. after providing suitable learning experiences) teacher asks some questions to check whether the students could recognise the relationship (i.e. he evaluates). But, he finds that the students cannot recognise the relationship between heating and the size of an object.

Then, what does the teacher do?

Following are the possible answers to this question.

- (i) teacher continues to teach without considering the fact students are not learning.

- (ii) teacher presents the material again in a new way,
may be with some more illustrations.

(Indicate your answer by writing (i) or (ii) in the answer sheet)

The correct answer is : (ii)

76. Teacher, when he finds (after evaluation) that students are not following him in the way he presented the material, changes his method of presentation as well as the content (i.e. presents new learning experiences) in order to enable the students learn.

In this instance what made the teacher present new learning experiences?

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar to :

The fact that students were not following his teaching made the teacher present new learning experiences.

77. Thus, in the above instance, teacher started with specific objectives and provided learning experiences and on the bases of his findings through evaluation he again presented new learning experiences.

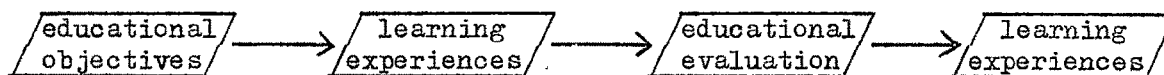
In this instance, can we say that evaluation comes while providing learning experiences?

(Write 'Yes' or 'No' in the answer sheet)

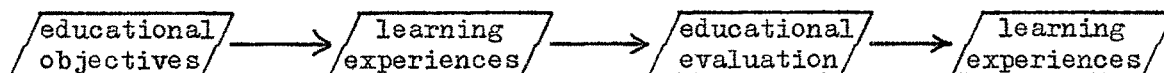
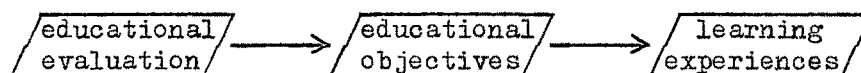
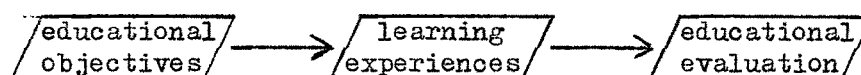
The correct answer is : Yes

Evaluation is done while presenting learning experiences to see the suitability of the learning experiences for achieving the objectives.

We may represent this situation by the following figure.



78. Thus, we have the following three figures representing instances involving evaluation at different stages.



Having in mind the above instances, let us try to answer our earlier question.

When do we evaluate the pupils?

Following are the possible answers.

- (i) at the beginning while specifying the objectives.
- (ii) at the end, i.e., after specifying the objectives and providing suitable learning experiences.
- (iii) while providing learning experiences.
- (iv) at all the above stages.

(Indicate your answer by writing (i), (ii), (iii) or (iv) in the answer sheet)

You are right if your answer is (iv)

-
79. From our discussion of the instances of evaluation, we found that evaluation is continuously done at all stages of teaching, i.e., while specifying the objectives, while providing learning experiences and also after providing learning experiences.

Therefore, we may state the principle that "educational evaluation is a _____ process".

(Write the missing word in the above statement in the answer sheet)

The correct answer is : continuous

We noted that evaluation is a continuous process. In other words, pupils are evaluated at all stages, i.e., while specifying the objectives, while providing learning experiences and also later to check whether the objectives have been achieved.

What do we evaluate in the pupils in all these situations?

80. We shall try to find an answer to the above question by recalling the definition of educational evaluation.

What is 'educational evaluation'?

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar to :

Educational evaluation is the process of determining the extent to which educational objectives have been achieved.

81. But, we find that the definition of educational evaluation says only about 'achieving educational objectives'.

What do we mean by achieving educational objectives?

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar to :

By achieving educational objectives we mean 'bringing about desirable changes in the children's knowledge, understanding, etc.'

82. Therefore, answer to our question, 'what do we evaluate in the pupils?' lies in answering the following question.

What do these changes in children's knowledge, understandings, etc. represent?

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar in meaning to the following.

Changes in children's knowledge, understandings, etc. correspond to their intellectual, social, emotional and physical development.

It is quite possible that you could not give the proper answer. In fact, you might have been confused by the answer because you may not understand fully the meaning of : "intellectual, social, emotional and physical development".

Let us try to analyse changes in knowledge, understandings, etc. and find out how they represent physical, intellectual, social and emotional development of the pupils.

83. We know that during schooling certain changes are expected to take place in pupil's knowledge, understandings, etc., including physical abilities.

Changes in physical abilities of the pupil such as his strength, physical independence, etc. correspond to his _____ development.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : physical

84. We may also say that changes in knowledge, understandings and skills of the pupils correspond to their _____ development.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : intellectual

85. Thus, some of the changes like changes in physical abilities, knowledge, etc., represent physical and intellectual development of the pupil.

Similarly, changes in such aspects as interests, attitudes, appreciations, adjustments may be considered to represent _____ and _____ development of the pupil.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : social; emotional

86. Combining the information given in the above three frames answer the following question.

What do changes in a pupil's knowledge, understandings, etc. represent?

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar in meaning to the following.

Changes in a pupil's knowledge, understandings, etc. represent the development of all the aspects - physical, intellectual, social and emotional - of the pupil.

-
87. In educational evaluation, we check the extent to which changes have taken place in the child's knowledge, understandings, etc.

Write what we do in educational evaluation in terms of development.

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar in meaning to :

In educational evaluation, we evaluate the development of physical, intellectual, social and emotional aspects of the child.

88. We may say that development of the different aspects, namely, physical, intellectual, social and emotional, together represent the development of the whole child.

Thus, in educational evaluation we evaluate the _____
_____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : whole child

89. By saying that in educational evaluation we evaluate the whole child, we have specified a very important characteristic of any good evaluation programme.

We may say that "A good evaluation programme should take into consideration the _____."

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : whole child

-
90. Rewrite the above characteristic of a good evaluation programme in terms of development of the child.

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar in meaning to the following.

A good evaluation programme should take into consideration all the different aspects of development of the child.

91. The above answer implies that evaluation of only the intellectual aspect of the child through certain tests and examination cannot be considered a good evaluation programme unless it includes evaluation of other aspects of child's development, viz., emotional, social, physical, etc. In other words, a good evaluation programme should be comprehensive. That is, it should be broad enough to include evaluation of all the different aspects of development of the child.

Thus, we have stated the characteristic of a good evaluation programme as follows.

Evaluation programme should be _____.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : comprehensive

Thus, in the above we have obtained answer to the question :
What do we evaluate in pupils?

In educational evaluation, we evaluate the whole child.

We also specified a characteristic of any good evaluation programme, namely, "An evaluation programme should be comprehensive".

Through the above discussions about the questions, 'when do we evaluate?' and 'what do we evaluate?', we have arrived at two important principles that should be borne in mind while organising the evaluation programme in any school. These two principles have been specified in the following two frames.

92. At the schools several decisions have to be made at different stages of providing education. For instance, decisions have to be made about the objectives to be specified for various courses, the courses that different students should study, and also, while providing instruction, the material that should be taught, the method to be adopted in presenting the material, etc. Accordingly, we may state the following principle regarding the programme of evaluation.

The evaluation programme should be a _____ process so that evidences obtained through evaluation provide the bases for all _____ at different stages of providing education.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : continuous; decision making

93. As you know, education is provided for an all-round development of the child. That is, there should be a balanced development of all the aspects of development of the child. In view of this, another principle concerning the evaluation programme may be stated as follows.

The evaluation programme should be _____ enough to include the evaluation of _____ of development of the pupil.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : comprehensive; all the aspects.

Combining the two principles we may state that "The evaluation programme in any school should be so organised that pupils are continuously evaluated in all aspects of their development".

We stated that a good evaluation programme should consider all the aspects of development of the pupil. Accordingly, evaluation is carried out in the school at different levels.

Evaluation is done with respect to specific areas of learning through entrance examinations or pre-tests, through questioning during day-to-day classroom teaching, through periodical tests and terminal examinations. Evaluation is also done which will be schoolwide in character and provide information about the pupils regarding their scholastic aptitudes, record of growth of achievement in different subjects, personal-social development, health, home background and the like.

But, a question that still remains is, 'why do we evaluate?' or 'what is the purpose of evaluation?'

Of course, the most proper and obvious answer would be that purpose of evaluation is to improve education provided at the school.

94. Improving education through evaluation requires that results of evaluation be used by all those involved in school education. Who are the people involved in providing education at schools?

There are three categories of people involved in it.

They are -

- 1.
- 2.
- 3.

(Specify the three categories in the answer sheet)

The correct answer is : 1. teachers

2. pupils

3. administrators

95. Thus, we have to find out in what way teachers, pupils and administrators can use the 'results of evaluation'.

But, what are 'results of evaluation'?

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar in meaning to the following.

'Results of evaluation' consist of evidences regarding the extent to which educational objectives have been achieved.

In simpler terms, we may say that results of evaluation tell us the learning that has taken place in the student or the changes that have taken place in his knowledge, understandings, skills, etc.

Let us, now see what are the uses of evaluation for the teachers.

96. Although equal facilities are provided in the school, we know that, pupils differ in their learning abilities, scholastic aptitudes, home background, social and personal adjustment, etc.

Suppose there are two teachers 'A' and 'B'. Teacher 'A' knows about aptitudes, home background, social-personal adjustment, learning ability, etc. of every one of his pupils. This information he has in addition to knowing their abilities in the subject which he teaches. But, teacher 'B' is concerned only with his pupils' abilities

to learn that subject which he teaches and he does not know anything about their family background, adjustment in school, etc.

Which of the two teachers, A or B do you think, would be able to teach his students more effectively?

(Write 'A' or 'B' in the answer sheet)

You are right if your answer is : 'A'

97. We know that learning, whether in the classroom or outside, depends upon various factors such as the learner's adjustment in the school and family, his interests and aptitudes, etc. Therefore, a teacher who understands his students in all aspects including their abilities in the subject can teach effectively.

But, how can a teacher get information about his students' home background, interest, aptitude, etc.?

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar in meaning to the following.

Teacher can get information regarding his students' home background, interests, etc. from the results of evaluation.

98. How was evaluation useful to the teacher in the above illustration?

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar in meaning to the following.

Evaluation was useful to the teacher in understanding his students in terms of their home background, interests, aptitudes, etc. and thereby be more effective in his teaching.

99. Consider the teacher who has to begin his teaching in std.IX.

Can the teacher assume that all his pupils in std.IX are equal in their achievement in the subject he has to teach?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : No

In fact, in each class and in each area of learning students differ in their abilities and achievement.

100. In order to teach effectively, the teacher should know the abilities and achievement of his students in that particular area of learning so that he can adjust his teaching to the differences among them.

In other words, the teacher should understand his students in terms of their abilities and achievement in particular area of learning.

How can the teachers obtain this information regarding the abilities and achievement of their students in particular areas of learning?

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar in meaning to the following.

Teachers can obtain this information through evaluation.

They can obtain this information about the pupils either (i) from the evaluation records of the pupils during the previous years, or (ii) from the results obtained through a test specifically prepared for this purpose.

101. Read Frame 97 carefully and answer the following.

In the above instance, how could evaluation be useful to the teachers?

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar in meaning to :

Evaluation could be useful to the teachers in understanding their students in terms of their abilities and achievement in specific areas of learning.

Thus, we have found that evaluation can be useful to the teachers in understanding the students regarding their abilities and achievement in particular areas of learning.

102. Your teacher has taught you about the two world wars. He asks the students several questions about facts related to the world wars. In other words, he evaluates the students. During the evaluation, your teacher comes across one of the following situations.

- (i) All the students answer his questions satisfactorily.
- (ii) Only a few students do not answer satisfactorily.
- (iii) Majority of the students do not answer satisfactorily.

What will the teacher do in the above three situations?

(Specify your answer to the three situations, separately, by writing one sentence for each in the answer sheet)

You are right if your answer is similar in meaning to the following.

- (i) Teacher will proceed with the next topic of teaching.

- (ii) Teacher meets those few students and helps them individually.
- (iii) Teacher reviews or reteaches the same topic in a new way.

103. Thus, we found that the teacher decides to do different things in different situations.

On what basis does he decide about what he should do, i.e., about his next course of action?

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar in meaning to the following.

He decides about his next course of action on the basis of the results of evaluation.

Thus, teachers can use evaluation results to take decisions about teaching at each stage as to what they should do next.

104. We noted that when majority of the students do not answer satisfactorily, the teacher understands that his teaching has not been effective and therefore, he changes his method of teaching. Thus, through results of evaluation of the pupils teacher checks the effectiveness of his own teaching.

In other words, evaluation of pupils can be used by the teacher to _____ his own teaching.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : evaluate

Thus , uses of evaluation, we have seen so far, for the teachers are (i) in understanding their students, (ii) in taking decision about teaching as to what they should do next, (iii) in evaluating their own teaching.

-
105. Suppose your mathematics teacher has taught the unit on 'addition, subtraction, multiplication and division of decimal numbers'. In order to evaluate the pupils he gives a test consisting of problems on decimals. When he checks the answers of the pupils he finds that many of the pupils have gone wrong on particular items in the test. He further discovers that all these items involve 'multiplication of decimals'.

What does this situation indicate to the teacher about his pupils?

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar in meaning to the following.

It indicates that pupils have difficulty in learning the multiplication of decimals.

106. The teacher gives a more detailed test consisting of only multiplication problems involving different types of decimals. He, then, finds that pupils have difficulties in multiplying only a particular type of decimals. Thus, the teacher diagnoses the learning difficulty and then, provides necessary instruction to remedy the difficulty.

We may say that evaluation results help the teacher in _____ the learning difficulties and providing suitable remedial instruction.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : diagnosing

Thus, another use of evaluation for the teachers is in diagnosing the learning difficulties of the students.

-
107. We have noted that evaluation is useful to the teachers in four different ways.

Specify the four uses by completing the following.

Evaluation is useful to the teachers

- (i) in _____,
(ii) in _____,
(iii) in _____,
and (iv) in _____.

(Write the missing parts in the above sentence, separately, as (i), (ii), (iii) and (iv) in the answer sheet)

The correct answer is :

- (i) in understanding their students,
(ii) in taking decisions about teaching as to what they should do next,
(iii) in evaluating their own teaching, and
(iv) in diagnosing the learning difficulties of the students.

Now let us see in what way evaluation is useful for the pupils.

108. We know that results of evaluation tell the students of their own progress in different areas of learning.

Consider two students 'X' and 'Y'. Suppose 'X' continuously knows about what is expected of him and what has been his progress in different areas of learning. But 'Y', although he is studying with 'X', does not know about his own progress in different areas.

Who of the two pupils, X or Y, will be more motivated to learn?

(Write X or Y in the answer sheet)

The correct answer is : X

109. Obviously, a student who knows about his progress will be more motivated to learn than the others.

Thus, evaluation is useful to the pupils as it _____ them towards learning, by providing them the knowledge of their progress.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : motivates

110. In educational evaluation, we compare the pupils' actual achievement with what they are expected to achieve.

When evaluation results (marks or grades) are provided to the pupils, continuously, pupils themselves try to compare their achievement with their earlier achievements with the average achievement in the class, and also with what they are expected to achieve. Thus, we may say that, using the results of continuous evaluation pupils try to evaluate themselves.

In other words, continuous evaluation leads the pupils towards _____.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : self-evaluation

111. Thus, evaluation is useful to the pupils in two ways.

Specify the two uses by completing the following.

Evaluation is useful to the pupils as it

(i) _____,

and (ii) _____.

(Write the missing parts in the above sentence, separately, as (i) and (ii) in the answer sheet)

The correct answer is :

(i) motivates them towards learning, and

(ii) leads them towards self-evaluation.

Lastly, we shall find out how evaluation can be useful for the administrators.

112. An important decision that administrators have to take every year is regarding promotion of students. We already know that promotions are decided on the basis of the performance of the students in tests and examinations, i.e., through evaluation.

Therefore, evaluation is useful to the administrators in deciding about _____.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : promotions

113. Also, we know that admission of pupils to different courses are decided on the basis of their performance measured



either through the examinations conducted in the previous years or through an entrance examination.

Therefore, we can say that, evaluation is also useful for the administrators in deciding about _____ of pupils to various courses.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : admissions

Thus, evaluation is useful for the administrators in deciding about admissions and promotions.

114. In certain school systems pupils are expected to take up different branches of study like science, arts, commerce, etc. for specialisation. We know that success in any branch of study depends upon the previous learning of the pupils, their interest and aptitudes. In such situations, school authorities are required to provide guidance to the pupils about the suitability of the different courses.

On what basis can we provide guidance to the pupils in the above situation?

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar in meaning to the following.

Guidance is provided to the pupils on the basis of evaluation results regarding their previous learning in particular branches of study, their interests and aptitudes.

Therefore, we may say that "evaluation is useful for providing guidance to the pupils."

II. Educational Evaluation and Measurement - B

In the last section, we learnt the meaning of educational evaluation, the five specific steps involved in the process of evaluation and certain other related facts about educational evaluation. In the present section, we shall learn more details about the different steps in the evaluation process as it may be carried out in school.

We observed that the two main stages in the process of evaluation are determining the learning outcomes and comparing them with the corresponding educational objectives. Therefore, we shall have to first know clearly the way in which learning outcomes represent learning and how should educational objectives be stated so that learning outcomes can be properly compared with them. Through this programmed unit, we would attempt to seek answers to the following questions.

--- How do learning outcomes specify learning?

--- How should we state the educational objectives for evaluation purposes?

Further, we noted that the first specific step in the process of evaluation is to select suitable technique of evaluation. Therefore, we will try to answer the questions -

--- What are the major techniques of evaluation?

--- What are the characteristics of the different techniques?

--- What are the instruments or tools through which these techniques are applied to determine the learning outcomes?

As we know 'testing' is the most familiar technique of evaluation used in our schools. Sometimes, testing is talked about as though it is synonymous with evaluation. Thus, we will clarify the role of tests in evaluation by answering the question -

--- What is the place of 'tests' in the evaluation process?

We also noted in the previous section that in order to be accurate in our evaluation we should measure the learning outcomes. Again, in this regard, we shall try to answer the questions -

--- What is the meaning of measurement in education?

How do we measure the learning outcomes?

--- Are all learning outcomes measurable?

We specified that after measuring the learning outcomes, they are to be compared with the educational objectives in order to judge whether the achievement of the objectives is satisfactory or not. But, what should be done, if there are non-measureable outcomes? Therefore we will finally answer the question -

--- How to express evaluation in terms of measurable and non-measurable outcomes?

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By now you must have understood that all discussions about educational evaluation centres, mainly, around three terms, viz., educational objectives, learning experiences and learning outcomes. We shall first try to refresh our memory about these three terms and then try to know about learning outcomes in greater detail.

1. Various activities like classroom instruction, laboratory training, games, sports, physical training classes, extra-curricular activities like debates, dramatics, etc., are organised in schools to provide _____ to children.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : learning experiences

2. Various learning experiences are provided in the schools in order to achieve the _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : educational objectives

3. At the school, students are made to participate in particular learning experiences. These learning experiences are selected on the basis of specific educational objectives to be achieved.

What happens to the students when they participate in various learning experiences?

(Write your answer in the answer sheet in one sentence)

You are right if your answer is similar in meaning to the following.

Learning or changes in the student's knowledge, understanding, skills, etc. take place when they participate in various learning experiences.

-
4. We may also say that various learning experiences are organised in the schools so that learning takes place in the students.

Therefore, learning or changes that take place in the students at the school are the result or _____ of various learning experiences.

(Write the missing word in the above sentence in the answer sheet)

You are right if your answer is : outcomes

5. Outcomes of various learning experiences provided at the school are called _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : learning outcomes

6. Combining the information provided in Frames 4 and 5, answer the following question.

What do learning outcomes specify?

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar in meaning to the following.

Learning outcomes specify learning or changes in the students' knowledge, understandings, etc., that take place in them when they participate in various learning experiences organised in the school.

7. We said that learning outcomes represent changes in knowledge, understandings, etc. As we have noted in the process of evaluation the teacher has to 'determine the

learning outcomes'. Thus, in order to determine the learning outcomes he should be able to observe the actual changes in knowledge, understandings, etc.

Can we directly observe the actual changes in knowledge, understandings, etc., of the students?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : No

Obviously, we cannot directly observe the changes in knowledge, understanding, etc., of the students. Therefore, in order to determine the actual learning outcomes, teacher has to find out those changes in the students which are observable and which represent changes in knowledge, understandings, etc.

In the following, we shall analyse certain specific situations of providing learning experiences and see what changes does the teacher directly observe in the students after providing the learning experience. In fact, we may consider these observable changes as the actual learning outcomes representing changes in knowledge, understandings, etc.

8. Consider the student who has not learnt anything about density of materials. The teacher teaches (i.e. provides learning experiences) the student about 'density of materials'. After the teaching the student
- (i) states the meaning of density.
 - (ii) gives reasons as to why a large log of wood floats on water while even a small piece of stone sinks down.

Does this situation represent any change in the student?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : Yes

It does represent changes in the student because after the instruction he states the meaning of density and gives reason for the particular phenomenon related to it, which he could not have done earlier.

9. Studying these changes in the student, as mentioned above, we find that changes are specified by the phrases 'student states' and 'student gives reasons'.

Thus, we may simply say that changes in the student are specified in terms of what the student _____ after the instruction.

(Write the missing word in the above sentence in the answer sheet)

You are right if your answer is : 'does' or 'performs'

10. We may also say that changes are specified in terms of performance or actions of the student after instruction.

Are these changes, as specified above, directly observable?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : Yes

We can always observe whether the student states the meaning of density or not and also, whether he gives reasons for the particular phenomenon or not.

11. Thus, in the above instance, learning or changes in the student have been specified in terms of what the student does after the instruction. And, these changes which are directly observable are the outcomes of the instruction

(learning experience) provided to the student. Therefore,
we may consider these changes as the _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : learning outcomes

Thus, we may say, from the above instance, that learning outcomes
are specifications of what the student does after the instruction.

12. Consider another instance. The teacher has taught the student about addition of decimal numbers. He, then, observes that the student solves problems involving addition of decimal numbers.

Again, the change in the student which the teacher could directly observe is in terms of what the student _____ after the instruction.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : does

13. Further, these changes, specified in terms of what the student does after the instruction, represent the learning that has taken place in the student. Also, these changes are the outcomes of instruction (learning experience) provided to the student.

Therefore, we may call these changes _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : learning outcomes

14. Read the above instance (described in Frames 12 and 13) carefully, and complete the following.

Again, in this instance learning outcomes are specifications of what the student _____ after _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : does; instruction

15. We may observe that, in the above two instances of providing learning experiences (or instruction), directly observable changes in the student are conveniently specified in terms of what the student does after instruction. In fact, these changes which are specifications of what the student does after the instruction represent the learning that has taken place in him. Also, they are the actual outcomes of the instruction provided.

Therefore, these specifications of what the student does after instruction are the actual _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : learning outcomes

In fact, in any instance of providing learning experience (instruction) learning outcomes may be conveniently specified in terms of what the student does after instruction.

16. We noted that in situations of providing learning experience (instruction) specifications of what the student does after instruction represent the changes in performance. But, as we know, changes in performance or actions can be considered to represent changes in the student's behaviour.

Therefore, we may say that specifications of what the student does after instruction represent changes in the student's _____.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : behaviour

17. Thus, specifications of what the student does after instruction represent changes in the student's behaviour. But, we also noted that learning outcomes are specified in terms of what the student does after instruction.

Study the above two statements carefully and answer the question -

How are learning outcomes specified?

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar in meaning to the following.

Learning outcomes are specified in terms of changes in the student's behaviour.

18. We also noted in the very beginning of our discussion that learning outcomes represent learning or changes in knowledge, understandings, etc., that take place as a result of the instruction (learning experience).

Then, how do learning outcomes represent learning or changes in the student's knowledge, understanding, etc.?

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar in meaning to the following.

Learning outcomes represent learning or changes in knowledge, understandings, etc., in terms of changes in the student's behaviour, i.e., in terms of what the student does after the instruction.

-
19. We have learnt that the first main step in the evaluation process is determining the learning outcomes. Further, from our discussion about learning outcomes, we have understood what we exactly try to find out in the students when we are determining the learning outcomes.

In fact, we understood that to determine the learning outcomes is to find out the _____ in students' _____ which represent changes in their knowledge, understanding, etc.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : changes; behaviour

20. Thus, learning outcomes are specifications of changes in the student's behaviour, i.e. what the student does after instruction. Of course, we know that changes take place in the students' knowledge, understanding, etc., when they participate in various learning experiences. And, therefore, they should be considered as learning outcomes.

However, for evaluation purposes learning outcomes are specified in terms of changes in the students' behaviour which, in turn, represent changes in knowledge, understandings, etc. This is because, changes in behaviour are directly _____ where as changes in knowledge, understandings, etc., are not.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : observable

Therefore, for evaluation purposes, learning outcomes have to be specified in terms of behavioural changes.

-
21. We have also learnt that after determining the learning outcomes, the next main step in the evaluation process is to compare them with the _____ .
Through this comparison, we determine the extent to which educational objectives have been achieved.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : educational objectives

22. If we consider an actual situation of teaching, educational objectives specify changes in knowledge, understandings, etc., that are expected to take place in the students.

Thus, in evaluation, we have to actually compare the learning outcomes with the _____ in knowledge, understandings, etc.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : expected changes

From the above, it is clear that for evaluation purposes, or more specifically, for comparing learning outcomes with educational objectives, it is necessary that educational objectives specify, in definite clear terms, the expected changes in the students' knowledge, understandings, etc. (i.e. expected learning outcomes).

Thus, we have to find out the proper way in which educational objectives may specify changes in the students such that learning outcomes can be properly compared with them.

23. As we know, learning outcomes, specify actual changes in the students' knowledge, understanding, etc., while educational objectives specify expected changes in the students.

Thus, in order to compare learning outcomes with educational objectives, we have to compare the _____ specified by learning outcomes with the _____ specified by educational objectives.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : actual changes; expected changes

24. Now, we may note that both educational objectives and learning outcomes represent changes in knowledge, understandings, etc. Therefore, it is clear that they can be more easily and directly compared if these changes are specified in _____ terms both by learning outcomes and educational objectives.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : same

25. Recall what you know about learning outcomes and answer the following question.

How do learning outcomes specify changes in the students' knowledge, understandings, etc.?

(Write the answer in one sentence in the answer sheet)

You are right if your answer is similar in meaning to the following.

Learning outcomes specify changes in knowledge, understandings, etc. in terms of changes in the students' behaviour.

26. Read the above answer along with Frame 24 and answer the following.

How should changes in knowledge, understandings, etc.,
be specified by educational objectives?

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar in meaning to the following.

Educational objectives should specify changes in knowledge,
understandings, etc., in terms of changes in the students' behaviour,
i.e. in terms of what the student does after instruction.

27. Thus, we may conclude that for purposes of evaluation
educational objectives should be stated in terms of
_____ in the students' _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : changes; behaviour

28. We said that educational objectives should be stated in
terms of what the student does after instruction. We may
note that this represents the student's performance after
the instruction.

In other words, we may say that educational objectives
should be stated in terms of the students' post-instruction
_____.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : performance

We concluded that for evaluation purposes, educational objectives
should be stated in terms of students' behaviour. However, in the
following, we shall try to understand the necessity of stating them
in that particular form. We shall first find out in what other
form can we state the educational objectives and see why that form
is not suitable for evaluation purposes.

-
29. We may see that educational objectives can be stated directly in terms of changes in knowledge, understanding, etc.

Suppose a teacher is teaching about the world war II. His objective is that through his teaching the students will acquire knowledge about the background of world war II.

State the objective in the above situation in terms of changes in knowledge.

(Write your answer in the answer sheet)

The correct answer is : The students will know the background of II world war.

Educational objectives in different situations may be stated in this form. The following are some examples.

1. The students will understand the concept of gravitational force.
2. The students will develop appreciation for music.
3. The students will increase their interest in athletics and games.

Now, let us analyse an objective and see why this form of stating the objective does not help in evaluation.

30. Let us suppose that two teachers 'X' and 'Y' are teaching about world war II, independently. Both of them have their objective as follows :

Students will know the background of world war II.

It can be easily observed that this educational objective is specified in terms of changes in the students' _____.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : knowledge

31. After teaching, teacher 'X' asks his students to list in writing the three important causes of world war II. On the basis of the students' answers to this, he decides that the objective has been achieved.

Specify the learning outcome expected in this situation.

(Write your answer in the answer sheet)

The correct answer is : Students list in writing the three important causes of world war II.

32. Consider the other teacher 'Y'. Y, after teaching, asks his students to write an essay describing the political relationship between the countries involved in world war II and also list the different causes. Again, on the basis of the students' performance he decides that the objective has been achieved.

What are the learning outcomes expected in the above situation?

(Write your answer in the answer sheet)

The correct answer is :

- i. Students write an essay describing the relationship between the countries involved in world war II.
- ii. Students list the different causes.

-
33. Study the above two situations and the learning outcomes specified therewith.

Are same learning outcomes expected in the two situations?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : No

34. As we know, teachers expect specific learning outcomes on the basis of the objectives specified. Thus, if the educational objectives have been properly stated for particular educational objectives same learning outcomes should be expected by all the teachers. In the above two situations the teachers had the same objective yet it can be observed that they expected different learning outcomes.

Why did the two teachers, 'X' and 'Y', expect different learning outcomes on the basis of the same objective?

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar in meaning to :

Because, the two teachers interpreted or understood the objective in different ways.

From this it is clear that the above objective stated in terms of changes in knowledge does not specify the expected learning or changes in the students in definite and clear terms.

35. We may find that all such objectives stated in terms of knowledge, understanding, appreciation, etc., may lead to similar confusion about the learning expected.

Thus, we may repeat our earlier conclusion that for evaluation purposes educational objectives should be stated in terms of _____ in the students' _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : changes; behaviour

36. Suppose in the illustration discussed above the two teachers had started with the objectives that after their teaching about World War II

(i) student describes, in about 15-20 lines, the political conditions that prevailed in Germany during the years 1938-39.

(ii) student lists in writing three causes for World War II.

Read these objectives carefully and answer the following question.

Do the above objectives specify expected learning outcomes in definite and clear terms?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : Yes

37. Of course, the objectives stated above may seem to be somewhat lengthy. But, at the same time, they are quite definite and clear about the learning outcomes that may be expected by different teachers.

Do you think that different teachers would interpret the above objectives in different ways?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : No

Obviously, all the teachers would understand these objectives in the same way as they specify the expected learning outcomes in definite and clear terms.

38. Study the two objectives stated in Frame 36 carefully and complete the following.

We may say that in these objectives, the phrases 'student describes' and 'student lists in writing', specify what the student _____ after instruction.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : does

39. We have noted earlier that 'what the student does after instruction' corresponds to changes in the student's behaviour.

Therefore, we may say that the above objectives have been stated in terms of _____
_____.

(Write the missing part in the above sentence in the answer sheet)

The correct answer is : changes in the students' behaviour

40. The above illustration confirms that for purposes of evaluation in specific instructional situations educational objectives should be stated in terms of behavioural changes.

This is because, objectives stated in this form specify the _____ outcomes in definite and clear terms.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : expected learning

We also learnt that educational objectives may not be stated using such words as 'knows', 'understands', etc., as they allow for different interpretations regarding the learning outcomes to be expected.

41. We have, now, learnt the proper way of stating educational objectives for evaluation purposes.

Which of the following objectives is properly stated?

- A. The student solves perimeter problems.
- B. The student understands perimeter problems.

(Indicate your choice by writing 'A' or 'B' in the answer sheet)

You are right if your answer is 'A'.

Objective 'A' provides the teacher with specific guidance for evaluation. He can actually observe students solving problems and check whether the objective has been achieved.

42. Which of the following objectives specify the expected learning in definite and clear terms?

- (a) The pupil enjoys reading the poem.
- (b) The pupil recites the poem without any error.

(Indicate your answer by writing (a) or (b) in the answer sheet)

The correct answer is : (b)

It is obvious that (a) cannot be the right answer, because enjoying a poem cannot be observed directly and therefore, allows for different interpretations regarding the expected learning outcomes. (b) is specified in terms of pupil's behaviour which can be directly observed. The teacher can clearly decide that the objective has been achieved if the pupil recites the poem without any error. Thus, it tells the teacher, in clear and definite terms, what learning he should expect when the objective has been achieved.

43. Let us now consider another characteristic of a properly stated objective. Take the following example :

"The pupil writes the summary of the poem."

We may easily see that this objective has been stated in terms of student's _____.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : behaviour

You may think that the objective is properly stated as we can directly observe whether the pupil writes the summary or not. But, let us study the following situation.

44. Suppose you have taught two pupils, 'X' and 'Y', with the above objective in view. After teaching you ask them to write the summary. You find that both 'X' and 'Y' have written the summary. But, 'X' has written it in 5-6 lines bringing out all the five ideas in the poem while 'Y' has written it in about 15 lines although he has not mentioned all the ideas.

Who has achieved the objectives, 'X' or 'Y'?

Possible answers to this question are

- (A) 'X'
- (B) 'Y'
- (C) We cannot decide

(Indicate your answer by writing (A), (B), or (C) in the answer sheet)

The correct answer is : (C)

45. Obviously, we cannot decide because, summary of a poem can be written in various lengths including all or some of the ideas depending upon the expected level of learning or performance. And, the objective, viz., "Pupil writes the summary of the poem" does not specify the required length of the summary and the ideas to be included, i.e., it does not specify the _____ of performance.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : expected level

46. Suppose the objective discussed above is stated as follows :

'Pupil writes the summary of the poem in about 10 lines referring to all the five ideas in the poem.'

Does this objective specify the expected level of performance?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : Yes

It specifies that the summary should be in about 10 lines and include all the five ideas in the poem. Thus, the teacher can always say

whether the expected level of performance is reached in achieving the objective.

47. Consider the objective (b) as stated in Frame 42. It states as follows

'Pupil recites the poem without any error'.

Does the above statement of objective specify the expected level of performance?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : Yes

The objective clearly specifies the expected level of performance. There should be no error when the pupil recites the poem.

48. From the above illustrations it is clear that in order to avoid confusion regarding expected learning outcomes, objectives should clearly specify the _____ of performance.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : expected level

49. In other words, we may say that a properly stated objective specifies the _____ of performance.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : expected level

50. Thus, we have learnt the two characteristics of a properly stated objective. They are

- (i) it should be in terms of changes in the student's _____ which can be directly _____.
- (ii) it should clearly specify the _____ of performance.

(Write the missing words in the above sentences in the answer sheet)

The correct answer is : (i) behaviour; observed
(ii) expected level

From the above discussions about learning outcomes and educational objectives we have learnt the way in which learning outcomes are specified. We have also learnt the proper form in which educational objectives should be stated for purposes of evaluation in specific instructional situations.

Let us, now, try to learn more details about different aspects of the evaluation programme as it is carried out in the schools.

51. We have learnt that through the evaluation programme information is obtained about the students' achievement in various school subjects and also regarding various other aspects such as their intelligence, aptitude, interest, attitude, adjustment, etc.

We also noted that evaluation of all these various aspects of the students is carried out in the schools by using several techniques which are called _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : evaluation techniques

52. If we study the various techniques of evaluation, we will find that different techniques adopt _____ procedures

for obtaining information about the students' learning
(i.e. for determining the learning outcomes).

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : different

53. We all know how teachers usually determine the learning outcomes. In other words, we know the procedure by which teachers obtain information about their students' learning or achievement in different school subjects.

Teacher determine the learning outcomes or achievement in different school subjects by giving _____ consisting of questions related to the topics that are taught.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : tests

54. We may say that evaluation of achievement in different school subjects is generally done using the technique of testing. Therefore, testing can be considered as an _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : evaluation technique

Let us consider a typical testing situation and see the procedure by which information is obtained by the teacher regarding the students' achievement (i.e. the learning outcomes).

55. Suppose that a teacher has given a test in physics. He, then, checks the answers written by the different students. From their answers he finds out what the different students have learnt (i.e. he determines the learning outcomes).

On what basis does the teacher determine the learning outcomes?

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar in meaning to the following.

Teacher determines the learning outcomes on the basis of the students' answers.

56. We also know that answers are written by the students according to what is required by the questions in the test.

We would, generally, find following type of questions in a test.

1. Describe the phenomenon.....
2. Define the term.....
3. Complete the following
4. Draw a diagram of.....

It can be observed that the words 'Define', 'Describe', 'Complete', etc. refer to certain tasks to be performed by the students.

In other words, we may say that a test requires the students to _____ certain _____.

(Write the missing words in the above sentence)

The correct answer is : 'perform' or 'do'; 'tasks'

57. The answers as we noted are according to what is required by the questions in the test. That is, answers are the products of doing what is required by the test. And, we said that a test requires the students to perform certain tasks.

Thus, the answers represent the _____ of _____ance
of certain _____ by the students.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : product; performance; tasks

58. We earlier understood that learning outcomes are determined from the students' answers. Also, we learnt that answers are the products of performance of certain tasks.

Therefore, we may say that in testing, learning outcomes are determined from the _____ of certain _____ performed by the students.

(Write the missing words in the above sentence)

The correct answer is : product; tasks

59. In the above situation, the product has been in terms of written answers. However, testing technique can also be used in other situations of evaluations as you may find in the following illustration.

Suppose a drawing teachers asks the students to draw a particular object. From what the students have drawn (product) he decides about their learning.

What technique of evaluation has the teacher used in this situation?

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar to

Testing is the technique of evaluation used by the teacher.

As we know tests are most commonly used by teachers for evaluating the achievement of students in different subjects. However, testing technique is also used in the evaluation of intelligence and aptitude.

60. Thus, we may say that the technique of testing is used to obtain information about certain aspects of the students such as achievement in school subjects, intelligence, aptitude, etc.

How do we obtain information about the student using the technique of testing?

(Write your answer in brief in the answer sheet)

You are right if your answer is similar in meaning to the following.

In testing, the students have to perform certain tasks. Information about the students is obtained from the product of tasks performed by the students.

Now, let us try to learn about another technique of evaluation.

61. Suppose your teacher has trained you in using a particular instrument in the science laboratory. Now, he wants to check whether you have learnt to use the instrument properly (i.e. he wants to determine the learning outcomes).

How does your teacher get this information?

Following are the possible answers.

- (i) He asks you to write the procedure of using the instrument and from your writing he gets the required information.
- (ii) He asks you to actually use the instrument in a proper situation and observes when you do so. Through his observation he gets the required information.

(Indicate your choice by writing (i) or (ii) in the answer sheet)

The correct answer is : (ii)

It is obvious that (i) cannot be the right answer because your writing of the procedure can only tell him whether you know the procedure or not. But, it does not help him check whether you can really follow the procedure when you use the instrument. As we can easily see, according to the procedure in answer (ii) he can directly check to what extent you have learnt to follow the procedure while using the instrument. However, we shall, first, analyse answer (i) and find out what technique of evaluation does the procedure in answer (i) represent.

62. According to this answer, viz., (i), the student writes the procedure. That is, we may say that the student has to _____ certain _____. Also, we may consider what the student has written as the product of the task he performs. Finally, teacher obtains the required information from this _____ of the task performed.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : perform; task; product

63. Read the procedure explained in Frame 60, and answer the following.

What technique of evaluation does this procedure represent?

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar in meaning to :

It represents the technique of testing.

Of course, we have already noted that this technique is not suitable in this particular situation.

64. Let us analyse answer (ii) and see the procedure involved. Since the student actually uses the instrument, we can say in this case also that student has to _____ certain _____. But, instead of going to the product of the performance, teacher gets the information through his observation of the _____ itself.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : perform; task; performance

65. Studying the procedure explained in Frame 62, we find that the teacher obtains the required information (i.e. learning outcomes) through his observation.

Therefore, we may call this procedure of evaluation as the technique of _____.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : observation

In the schools, technique of observation is used for the evaluation of achievement of specific skills, and also in the evaluation of students' social and personal adjustment, etc.

66. We can observe one basic difference in the two techniques of evaluation viz., testing and observation.

In testing, information about the student is based on the _____ of the performance of a task. On the other hand, in observational technique, it is based on the very _____ of the task and not any product.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : product; performance

We may, further, note that both in testing and observation, information about the student's achievement in school subjects, intelligence, aptitude, adjustment, etc., is obtained indirectly as it is based either on the student's performance of a task or on its product.

67. Apart from these indirect methods, information about certain aspects of the student can be obtained directly from the student himself. In other words, for obtaining certain information about the student, we can make the student report about himself.

This procedure of obtaining information about the student, where the student is reporting about himself is called _____ technique.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : self-reporting

At the school, self-reporting technique is used in the evaluation of such aspects as interest, attitude, etc.

68. These three techniques discussed above are the major techniques of evaluation used in the school.

What are the three major techniques of evaluation used in the schools?

(Specify the three techniques as 1., 2., and 3. in the answer sheet)

The correct answer is : 1. Technique of testing
2. Technique of observation
3. Self-reporting technique

Before going further, let us try to recall the definition of educational evaluation. We defined educational evaluation as the process of determining the extent to which educational objectives have been achieved.

Then, we further analysed the process of evaluation and found that the process involves five specific steps.

69. We noted that the first two specific steps involved in the process of evaluation are :

- (i) Select a suitable _____ considering the specific objective to be achieved.
- (ii) _____ the selected technique to determine the learning outcomes.

(Write the missing words in the above sentences in the answer sheet)

The correct answer is : evaluation technique; Use or Apply

In this connection, we have already learnt about the three major evaluation techniques that are used in the schools. We have also learnt the procedure by which learning outcomes are determined through these techniques.

70. We noted that learning outcomes are to be, then, compared with educational objectives in order to determine the _____ to which educational objectives have been achieved.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : extent

71. We further noted that in order to ~~make~~ the evaluation more accurate (i.e., to determine the extent of achievement

of objectives more accurately) we may _____ the learning outcomes before comparing them with educational objectives.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : measure

Thus, we specified "measurement of learning outcomes" as one of the five steps in the process of evaluation.

You may be wondering as to what is meant by measurement of learning outcomes and how can we measure learning.

72. Let us recall the meaning of learning outcomes. We said that learning outcomes are specifications of _____ in the students' behaviour.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : changes

73. Since learning outcomes specify certain changes in the students, measurement of learning outcomes would be related to these _____ in the students.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : changes

74. From our experience in measurement of length, volume, weight, etc., we know that any change in these aspects always exists in certain specific amount or quantity. Therefore, in the case of learning outcomes also, we may say that changes in the students' behaviour exist in certain specific _____ or quantity.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : amount

75. From the above frame it is clear that measurement of learning outcomes means the measurement of the specific _____ of _____ in the students' behaviour.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : amount of changes

76. Again, in the measurement of length, volume, weight, etc., we know that the amounts of changes are specified by assigning specific numbers such as 2 ft., 20 litre, 3 kg., etc.

Similarly, learning outcomes are measured by assigning specific _____ which indicate the _____ of _____ in the students' behaviour.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : numbers; amount or quantity of changes

From the above we may simply say that in measurement of learning outcomes specific numbers indicate the amount of learning that has taken place in the students.

In fact, we are all familiar with the idea of giving marks (assigning numbers) to students based on their answers to the questions in a test.

77. From our knowledge about the technique of testing, we know that learning outcomes are determined on the basis of the answers to the questions in a test. Thus, when we give

numbers or marks to the answers, we actually m
the learning outcomes.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : measure

78. We frequently find teachers saying after a test or examination, that a particular student has got 82 marks while another has got only 40 marks and so on. Here, we may say that the teacher has _____ the students' learning (i.e. learning outcomes) through the test.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : measured

79. Consider the illustration wherein your teacher has trained you to operate a particular scientific instrument step by step. Now, he has allowed you to operate the instrument and is observing you when you do so. While observing he notes down the number of steps that you properly carry out and of those in which you go wrong.

Can we say that the number of steps you have properly carried out represent that amount of learning?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : Yes

In a way, this number gives the teacher a measure of how much has been learnt by you. In other words, this specific number indicates the amount or quantity of learning that has taken place in you.

-
80. Thus, we have noted that learning outcomes are measured by assigning specific _____ which indicate the _____ of _____ that has taken place in the students.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : numbers; amount of learning or
quantity of learning

81. After measuring the learning outcomes, we _____ them with educational objectives to determine the extent to which objectives have been achieved.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : compare

Let us consider a specific situation of testing wherein we have determined the learning outcomes and also, have measured them. We shall try to understand how we compare measured learning outcomes with the educational objectives.

82. We may recall that educational objectives can be considered as expected learning outcomes. Thus, for determining the extent of achievement of the objectives, we have to compare actual amount of learning with _____ amount of _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : expected; learning

83. Suppose in a testing situation we have determined the learning outcomes and also, measured them. We have noted

that the actual amount of learning that has taken place in the students is represented by specific _____ or marks such as 80, 45, etc.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : numbers

84. We also know that in any test these marks like 80, 45, etc., assigned to the students are always considered as out of a _____ marks of 100, 50, etc.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : total or maximum

It may further be observed that a student gets this maximum or total marks like 100, 50, etc., on a test if all the questions in the test are correctly answered by him. But, as we know, the different questions in a test correspond to the different objectives to be achieved, or in other words, to the expected learning outcomes.

85. We know that learning outcomes represent the amount of learning in the students.

Thus, we may say that expected learning outcomes which are specified in the questions on a test represent the _____ of learning in the students.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : expected amount

86. From the above, we may say that the marks a student gets by answering all the questions correctly represent the expected amount of learning in the students.

Thus, in a test, the maximum marks like 100, 50, etc., specify the _____ of _____ in the students.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : expected amount of learning

87. Now, it is clear that after measuring the learning outcomes we compare them with the objectives by comparing the marks obtained by the students which represent the _____ of learning with the maximum marks that can be obtained which represent the _____ of learning.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : actual amount; expected amount

88. As the marks on a test are just numbers, we actually have to compare specific _____ like 80, 45, etc., representing the extent of learning that has taken place with specific _____ like 100, 50, etc., representing the total extent of the educational objective that could have been achieved (i.e. the total extent of learning that could have taken place).

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : numbers; numbers

89. This comparison of specific numbers which is generally expressed as 80 out of 100, or 45 out of 50, etc., clearly specifies the extent to which the expected learning has taken place, or in other words, the _____ to which _____ have been achieved.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : extent; educational objectives

90. As we had already noted, it may be observed that by measuring the learning outcomes, we would be determining the _____ of achievement of the objectives more accurately. This is because, it is decided through the comparison of two specific _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : extent; numbers

91. We may observe that in the above, we obtain quantitative descriptions (i.e. in terms of numbers) of the students' learning (actual learning outcomes) and the educational objectives (expected learning outcomes). By comparing these, we also obtain a _____ of the extent to which the objectives have been achieved.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : quantitative description

Now, let us look to what has been learnt. We have learnt the specific steps through which we determine the learning outcomes, measure them and compare them with the educational objectives to obtain a quantitative description of the extent of achievement of the objectives.

92. Next specific step in the evaluation process represents the final aim of the process. It is to _____ the extent of achievement of the objectives.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : judge

In fact, we judge the extent of achievement of the objectives to decide whether it is very good, or good, or average or poor, etc.

93. Suppose your teacher has given a test. Based on the marks obtained by the students, he considers a few of them to be very good, some others to be good or average and so on.

We may say that the teacher evaluated the student by _____ the quantitative description of achievement and assigning such values to it as good, average, etc.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : judging

94. Thus, we may conclude that in the final step of the evaluation process we _____ the students by assigning such _____ as good, average, poor, etc. to the quantitative description of the learning that has taken place in them.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : judge; values

Thus, we have learnt in detail about the five specific steps involved in the process of evaluation.

Let us take a closer look at the evaluation programme as it is generally carried out in schools.

95. We can observe that tests constitute the most commonly observable feature of any programme of evaluation. Because of this, it is sometimes talked about as though testing and evaluation mean the same.

Do testing and evaluation mean the same?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : No

In fact, evaluation is a process which aims to judge the students' learning as satisfactory or not. And, we come across testing only at a particular stage in carrying out this process.

96. Let us try to clearly know the place of testing in the evaluation programme.

What is 'testing'?

(Write your answer in one sentence in the answer sheet)

The correct answer is : Testing is a technique of evaluation.

97. We may also say that testing is a particular procedure of determining learning outcomes.

Is testing the only technique of evaluation used in schools?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : No

In fact, we have learnt that there are three major evaluation techniques, viz., testing, observation, and self-reporting.

98. Moreover, we have also learnt that testing is suitable for obtaining information regarding only certain aspects of the students such as their achievement in school subjects, intelligence and aptitude.

In other words, tests are useful in the evaluation of only some aspects of _____ of the student.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : development

But, we know that evaluation programme should be comprehensive enough to consider all aspects of development of the pupils and therefore, involve the use of all the different evaluation techniques.

We may conclude regarding the role of tests in the total evaluation programme as follows :

99. Tests represent only one of the three _____ used for determining the students' learning.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : evaluation techniques

100. We may also say that testing is useful for the evaluation of only some _____ of _____ of the pupil while a comprehensive evaluation programme has to consider all _____ of _____ of the pupil.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : aspects of development;
aspects of development

Sometimes, we may find that evaluation process is considered in such a way as though it is only to assign number or marks to represent students' learning.

101. In other words, sometimes evaluation and measurement are considered to mean the same.

Can we say that measurement and evaluation are the same?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : No

Let us try to note the place of measurement in the evaluation process.

102. We know well that measurement is only one of the steps in the process of evaluation.

It is the process of assigning specific _____ to the students' learning.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : numbers

103. But, evaluation process cannot be considered to have been completed just by assigning numbers or marks.

In order to evaluate the students' learning, we have to _____ this specific number or marks representing actual amount of learning with the maximum marks representing the expected amount of learning.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : compare

Based on this comparison student's achievement is judged and assigned values such as good, satisfactory, etc.

-
104. Further, in order to determine whether the pupil is satisfactorily progressing or not, teacher may _____ the present achievement of the student with his _____ achievements. He may also compare it with the _____ achievement of the class as a whole and so on.

(Write the missing words in the above sentences in the answer sheet)

The correct answer is : compare; previous or past; average

105. Of course, we may note that measurement makes all these comparisons more _____ as the comparisons would be between two specific _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : accurate; numbers

Thus, we may conclude the following regarding the place of measurement in the evaluation process.

106. Measurement is only _____ in the process of evaluation.

Measurement makes evaluation more _____ by providing a _____ description of the student's learning.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : a step or a part or one of the steps;
accurate; quantitative

From the above discussions about testing and measurement, it is clear that testing and measurement correspond to two particular steps in the process of evaluation. And, they should not be mistaken to represent the whole process of evaluation.

Let us learn another important point about the measurement of learning outcomes.

107. Through measurement we obtain a quantitative description of the student learning.

In other words, we measure the learning outcomes by assigning specific _____ to the _____ of change or learning in the students.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : number; quantity

That is, we specify the change or learning in the students in quantitative terms.

Let us consider the following situation and see whether the teacher can specify the learning in the students in quantitative terms.

108. Suppose a teacher is teaching good handwriting. Now, he wants to know whether there is any improvement in the student's handwriting. For that he asks the student to write and he checks his writing. He finds that the student has improved his handwriting. That is, we may say that learning has taken place.

Can the teacher assign a specific number to the improvement that has taken place?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : No

This is because, improvement is to be seen only in the quality of handwriting and not in terms of quantity.

109. In other words, the change or learning in the student can be expressed only in qualitative terms.

Thus, we may say that regarding handwriting, we can obtain only a _____ description of the learning outcome.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : qualitative

110. We find that in the above case we could not obtain a quantitative description of students' learning.

We may, therefore, say that the particular learning outcome can not be _____.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : measured

In fact, we may find that there are many other aspects such as appreciation, adjustment, dramatisation, etc. for which we cannot obtain a quantitative description of the learning outcomes.

Or we may simply say that some of the learning outcomes are not measurable.

111. We have earlier noted that in the final step of the evaluation process we judge the quantitative description of the students' learning and assign _____ like good, poor, satisfactory, etc.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : values

112. But we noted that certain learning outcomes are non-measurable and we can obtain only a qualitative description of the student's learning.

Therefore, in the case of non-measurable outcomes value judgement (i.e. judging and assigning values) has to be made on the basis of the _____ description of the student's learning.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : qualitative

Thus, we find that some aspects of learning or development are measurable and some others are non-measurable.

113. But, the evaluation programme should consider outcomes related to all aspects of learning.

Therefore, evaluation programme should take into consideration both _____ and _____ learning outcomes.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : measurable; non-measurable

114. From the above we may say that in evaluation, for some aspects of learning the value judgements would be based on the quantitative description and for others it would be based on a qualitative description.

Considering both the above aspects we may represent the evaluation programme as follows.

Evaluation →		_____ description + value judgement
		(measurable outcomes)
		_____ description + value judgement
		(non-measurable outcomes)

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : quantitative; qualitative

III. Characteristics of a Good Instrument of Evaluation

From our discussion in the previous sections we have learnt that evaluation programme in the school takes into consideration the pupil as a whole, i.e., all aspects of behaviour or development of the pupil. And, results of evaluation are useful in various ways for teachers, pupils and others involved in school education.

We also noted that different evaluation techniques are used depending upon the objectives with reference to which evaluation has to be done. In other words, while selecting a specific evaluation procedure we have to consider its suitability for the particular aspect of development of the pupil that has to be evaluated.

From the above observations, it becomes clear that we have to look to certain important points while selecting a specific procedure of evaluation. For instance, we have to, first of all, check whether the specific procedure really provides information about that particular aspect which we want. Also, we have to see whether we can adopt the same specific procedure for evaluating a particular aspect of development of the student, at different times. And, even if the above questions are answered satisfactorily, we shall have to think whether the specific procedure chosen is usable in the school situation and so on. In short, we may say that while selecting a specific procedure of evaluation we have to see whether it possesses certain essential characteristics.

In this section, thus, we shall try to answer the questions

--- What are the characteristics of a good evaluation procedure?

--- What factors affect these characteristics?

Further, as we proceed to answer these questions, we would find that these characteristics are not independent. Thus, we shall also try to answer the question

--- How are these different characteristics related to each other?

We have learnt that, evaluation programme in the school should take into consideration all aspects of development of the pupils.

1. In order to evaluate different aspects of development, we have to first obtain information regarding these aspects of the student.

In this context, we noted that different _____
_____ are used to obtain information about different aspects of development of the pupil.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : evaluation techniques

2. Therefore, in the evaluation process a teacher has to select and apply a specific evaluation technique suitable for the particular aspect of _____ of the pupil that has to be evaluated.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : development

3. Regarding the selection of the suitable technique we have already learnt something.

We noted that, mainly, three evaluation techniques are used in the schools. Of these, technique of _____ is suitable for evaluation of certain aspects like achievement in various school subjects, intelligence, aptitude, etc. And, the other two techniques, namely, _____ technique and _____ technique are suitable for evaluation of such other aspects as personal-social adjustment, attitude, interest, etc.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : testing; observation; self-reporting

Thus, the question that remains is how are these techniques applied. For this, let us consider how technique of testing is applied in schools.

4. In fact, we already know that testing technique is applied in schools using certain tests like achievement _____, intelligence _____, etc.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : test; test

That is, 'tests' represent materials used for applying the technique of testing in the evaluation process.

5. In other words, we may simply say that 'tests' represent materials used for the purpose of _____ of certain aspects of development of the students.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : evaluation

6. As we know, in physical science, materials such as metre scale, litre can, etc., which are used for the purpose of measurement of length, volume, etc., are called tools or instruments of measurement.

On the same lines, 'tests' which are used for the purpose of evaluation may be called _____ of evaluation.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : tools or instruments

7. Thus, we may say that technique of testing is used in the evaluation process with the help of certain _____ of _____ called 'tests'.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : instruments of evaluation

Similarly, under the techniques of observation and self-reporting certain other instruments of evaluation like rating scales, check-lists, questionnaires, inventories, etc., are used.

8. Therefore, we may, in general, say that different techniques of evaluation are applied with the help of various _____ of _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : instruments of evaluation

9. Thus, at schools, various _____ of _____ like achievement tests, intelligence test, rating scales, questionnaires, inventories, etc., are used in the evaluation process for obtaining information about different _____ of _____ of the pupils.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : instruments of evaluation;
aspects of development

10. Further, we know that the final results of evaluation are based on the _____ obtained through these _____ of evaluation.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : information; instruments

From the above, it is clear that in order to get accurate results of evaluation we should select and use a proper instrument of evaluation. This takes us to the question : In order to get accurate results, what essential characteristics should we look for in an instrument of evaluation while choosing it?

11. We know that evaluation results are used for different purposes in schools. We also know that these results are based on the information obtained through different instruments of evaluation.

Therefore, we may say that different instruments of evaluation are used for _____ of evaluation at schools.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : different purposes

12. This implies that specific instruments of evaluation have to be selected for serving specific _____ of evaluation.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : purposes

13. The above point clearly indicates that while choosing an instrument of evaluation the first characteristic we have to look for is whether it serves the _____ for which it is being used.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : purpose

14. In our daily life we use certain things like, certificates, licence cards, entrance tickets, etc., for certain specific purposes. And, we consider them as valid if they serve the specific purpose which they are being used, and as not valid if they do not.

Similarly, an instrument of evaluation is considered as _____ if it serves the _____ for which it is being used.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : valid; purpose

15. Thus, the first characteristic an instrument of evaluation should possess is that it should be _____. An instrument which is valid is said to possess the characteristic of _____ity.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : valid; validity

16. Therefore, we may state that the extent to which a particular instrument of evaluation serves the purpose for which it is intended is referred to as the _____ of the instrument.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : validity

17. Since evaluation instruments are used for different purposes in the schools, we come across _____ types of validity.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : different

In fact, generally, four types of validity are identified in educational measurement.

In the following, we shall try to find out what are these four types of validity. We shall be discussing each type as it relates to testing procedures in schools. However, these four types of validity are applicable to all instruments of evaluation used in the school.

18. A particular purpose for which we use tests is to obtain information which indicates the extent to which students have learnt specific content material in different school subjects.

Thus, when a test serves this particular purpose, we may say that the test has _____ with reference to the purpose of determining students' learning of specific content material.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : validity

19. It may be observed that this particular type of validity is mainly related to the content area of learning that is being considered by the test.

Accordingly, a test having this type of validity is said to possess _____ validity.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : content

20. Thus, we may say that a test possesses _____ validity to the extent the information obtained through it indicates student's achievement with respect to specific _____ areas of learning.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : content; content

21. Sometimes, teachers use test performance of students for the purpose of drawing conclusions about their future learning ability in the particular area tested. Thus, this is another purpose for which evaluation results are sometimes used. Can we say that the purpose, here, is to use the test results for predicting the future performance of the students?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : Yes

22. In other words, we expect the information obtained through the particular test to serve the purpose of predicting future performance of the students.

Thus, when information obtained through a test serves this particular purpose of _____ future performance we may say that the test has _____ with reference to this particular purpose.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : predicting; validity

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23. As we can see, this refers to a particular type of validity of a test which is based on the predictive value of the information obtained through it.

Therefore, this particular type of validity of a test is referred to as its _____ validity.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : predictive

24. Thus, a test is said to possess _____ validity to the extent the information obtained through it serves the purpose of _____ the future performance of the students in a particular area of learning.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : predictive; predicting

25. In fact, a specific type of tests called aptitude tests are specially meant for the purpose of predicting the future performance of the students in specific areas of learning.

For instance, the results obtained through an aptitude test in Mathematics should enable the teacher to _____ somewhat accurately, the future success of the student in learning Mathematics.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : predict

26. We quite often compare the time shown by our watch to that given over the radio or by another watch which is known to show correct time. We consider the time shown by our watch

to be alright or valid to the extent it shows the same time as that given over the radio or by the other watch which is known to show correct time.

In other words, if we have two proper or valid instruments measuring the same aspect say, time, we naturally expect the time shown by them to be _____ or concurrent.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : same

27. Suppose we have prepared a test for the purpose of measuring a particular aspect. And, we already have another test which is known to measure the same aspect accurately.

We, naturally, expect the results obtained through the test we have prepared to be _____ as or concurrent with those obtained through the other.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : same

28. In other words, a test measuring a particular aspect is considered to be _____ to the extent it provides information which is same as or _____ with the information obtained through another test which is being currently used for measuring the same aspect.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : valid; concurrent

29. Thus, we have come across another type of validity. We may observe that this particular type of validity is based on

the extent to which the results obtained through a test are concurrent with those obtained through another test in current use for measuring the same aspect.

Therefore, ~~a test~~g having this type of validity is said to possess _____ validity.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : concurrent

30. We may say that a test possesses _____ to the extent the information obtained through it is concurrent with that obtained through other tests measuring the same aspect.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : concurrent validity

31. We also use tests to measure certain psychological characteristics of the student such as his intelligence, creativity, abstract thinking, motivation to learn, anxiety, persistence, etc. In these cases, we take the test results to indicate the degree to which a student possesses these psychological characteristics.

Thus, another purpose for which tests are used is to obtain information about the degree to which a student possess certain _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : psychological characteristics

-
32. As we know these characteristics are abstract and are defined in terms of certain psychological concepts or principles. And, therefore, these characteristics are referred to as psychological constructs.

Thus, we may say that certain tests are used with the purpose of finding out the degree to which a student possesses certain psychological _____.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : constructs

33. Thus, we have come across another type of validity. This type of validity refers to the purpose of using tests for measuring certain psychological _____.

Since, the purpose corresponding to this type of validity refers to the measurement of a psychological construct, this type of validity is called _____ validity.

(Write the missing words in the above sentences in the answer sheet)

The correct answer is : construct; construct

34. Thus, a test of a particular construct, like a test of intelligence or a test of creativity, etc., is considered to have _____ to the extent results of that test indicate the degree to which that particular _____ is possessed by the student.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : construct validity; construct

-
35. But, we noted that these constructs, namely, intelligence, creativity, abstract thinking, etc., are themselves abstract and they have to be understood in terms of certain psychological concepts or principles.

Consider for instance the construct, intelligence. Regarding this construct, viz., intelligence a principle that we know is that degree of intelligence possessed by a boy increases as his age.

Therefore, if we administer a test of intelligence and note down the intelligence level at different age levels of a student then the test results should indicate that _____ level increases as the age increases.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : psychological concept or principle

36. We have many other psychological concepts and principles underlying intelligence. And, therefore, the results of an intelligence test should be explainable in terms of all these _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : psychological concepts or principles

37. Thus, in general, the results of a test of any psychological construct should be explainable in terms of the _____ which underlie that particular construct.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : psychological concepts or principles

-
38. Therefore, we may say that a test has served the purpose of measuring a particular psychological construct if its results can be interpreted in terms of the psychological concepts or principles underlying that construct.

That is, a test can be considered as _____ for measuring a particular psychological construct if its results can be interpreted in terms of the _____ underlying that construct.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : valid; psychological concepts

39. From the above discussions, we may conclude that a test possesses _____ validity to the extent results obtained through it can be interpreted in terms of the _____ underlying the particular psychological construct that is being measured.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : construct; psychological concepts or principles

40. Thus, we have noted that there are four types of validity which we have to look for while choosing a particular instrument of evaluation depending upon the purpose of evaluation.

These four types of validity are :

- 1.
- 2.
- 3.
- 4.

(Specify the four types of validity)

The correct answer is : 1. Content validity
 2. Predictive validity
 3. Concurrent validity
 4. Construct validity

41. Each of these four types of validity has been identified with reference to different purposes for which evaluation results are used.

Thus, whenever we discuss the validity of an evaluation instrument, it must be with reference to a specific _____ for which the information obtained through it has to be used.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : purpose

42. In other words, information obtained through an instrument, say an achievement test in Mathematics, may very well serve the purpose of indicating a student's achievement in certain content areas of Mathematics. But, it may be of little use for predicting his future performance in Mathematics.

That is, an evaluation instrument may possess high content validity, but, its _____ validity may be very low.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : predictive

Similarly, results of a numerical aptitude test may have high predictive value for predicting a student's success in mathematical

computation. But, they may be of limited value for predicting the student's mechanical ability.

43. Thus, in selecting a particular evaluation instrument we should, mainly, look for that particular type of _____ which refers to the particular purpose for which the results obtained through it are to be used.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : validity

44. We often come across selection tests being conducted for selecting persons for new courses of study or for new vocations (jobs). Based on the results of these tests, we select those persons who, we think, will succeed well in the new courses.

In choosing such selection tests we have to mainly consider their _____ validity.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : predictive

It is quite obvious that when we are selecting a person for a new course or job we are mainly interested in predicting his future performance. And, therefore, results of selection tests have to serve this purpose of prediction.

45. Periodical tests and examinations are conducted in various school subjects. The main purpose of these tests is to measure student's achievement in specific content areas of learning.

Therefore, the type of validity we expect these tests and examination to possess is _____ validity.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : content

This implies that these tests and examination may or may not be suitable for predicting the future performance of the student.

46. However, at our schools and colleges we quite often select students for different branches of study mainly on the basis of their performance in previous achievement tests.

Thus, in these situations, we assume the achievement tests to possess _____ validity although we know that they may not serve the purpose of predicting future performance.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : predictive

47. We may observe another important point about the different types of validity. That is, we consider an instrument of evaluation to possess a particular type of validity if the results obtained through it serve the purpose for which they are to be used.

For instance, consider an achievement test. In an achievement test we, mainly, look for _____ validity. We decide that a test possesses this type of validity if _____ obtained through it serve the purpose of evaluating student's achievement in specific content areas of learning.

(Write the missing words in the above sentences in the answer sheet)

The correct answer is : content; results

But a question that arises at this point is : What should be the nature of a test, if the results obtained through it should serve this purpose of evaluating student achievement? We shall try to answer this question in the following frames.

48. We know that specific content areas of a subject are taught with a view to achieving certain specific educational _____.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : objectives

49. Therefore, we use results of achievement tests to determine the extent to which all these specific _____ have been achieved.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : objectives

50. In other words, an achievement test in a particular content area may be considered to possess content validity if it serves the purpose of determining the extent of achievement of all the specific _____ related to that particular content area.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : objectives

51. Suppose, your teacher has taught you a particular unit in science, say, on 'water' with some fifteen specific objectives. Then, he prepares and uses a test containing questions related to these fifteen specific objectives.

Can you say that this test used by the teacher has content validity?

(Write 'Yes' or 'No' in the answer sheet)

You are right if your answer is : Yes

Thus, a test of particular content material will have content validity if it contains questions relating to all the specific objectives of that particular content material.

52. But, suppose you, as a teacher, have to conduct a comprehensive test for a complete course containing several units. In this case, since the content material is large, corresponding specific objectives will also be large in number. And, obviously, you cannot have questions covering all the objectives.

In such a situation, how would you prepare a test which is comprehensive and also valid?

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar in meaning to the following.

You would prepare a test with questions referring to a sample of objectives selected from the total set of objectives for the complete course.

Thus, in preparing a comprehensive test for a course with large content material we have to select a sample of objectives from the set of objectives for the complete course. In fact, we may observe that the question papers that the students answer during the final examinations have to be of this type. Therefore, we shall try to understand how to select this sample of objectives from the total set of objectives for the courses.

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53. Suppose a teacher has taught an elementary science course consisting of four content units. Then he prepares a comprehensive test for the complete course. But, by studying the questions included in the test you find that they correspond only to a sample of objectives related to the first three content units of the course. And, there is no question related to the last unit.

Do you consider this test to be valid?

(Write 'Yes' or 'No' in the answer sheet)

You are right if your answer is : No

Obviously, it is not a valid test as the sample of objectives taken for testing does not represent the last content unit of the course.

54. Thus, we may say that for preparing a valid test the teacher has to first choose a sample of objectives which _____ all the content units of the course.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : represent

55. Many times, we find students complaining that our examinations test only the memory of the students and not their learning. What does this indicate about the validity of these examinations?

It indicates that these examinations do not have _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : content validity

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56. As we know several facts, principles, etc., are taught to the students in schools. But, we expect the students merely to know certain points which they can reproduce by memory; we expect certain other points to be understood by them; we also want them to be able to apply certain other aspects of their knowledge, and so on. Accordingly, the total set of objectives for a course would contain objectives of all levels, viz., knowledge objectives, understanding objectives, application objectives, etc.

Thus, we may say that the examinations which require the students only to reproduce certain points from memory contain questions representing only _____ objectives and do not contain questions related to other levels of objectives, namely, _____ objectives, _____ objectives, etc.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : knowledge; understanding; application

57. From the above, it is clear that a valid examination of students' achievement should include questions related to objectives of all levels included in the course.

In other words, we may say that in order to prepare a valid question paper for a comprehensive examination we should choose a sample of objectives which includes objectives of all levels, namely, _____ objectives, _____ objectives, _____ objectives, etc.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : knowledge; understanding; application

-
58. Consider another situation, where a comprehensive test has been prepared with questions relating to all content units of the course. But, you may find that all the questions in the test are very easy. Or, you may find that all of them are very difficult.

Can we consider such a test to be valid?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : No

Obviously, it cannot be a valid test as the results of such a test would not evaluate student's achievement of topics of all difficulty levels.

59. Thus, we may say that a valid test should include questions of all _____ levels.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : difficulty

From the above discussions, we have noted the different qualities that are essential for an achievement test to be valid.

60. So far, we have learnt that _____ is one of the essential characteristics of a good instrument of evaluation. And, we identified four types of validity, viz., _____ validity, _____ validity, _____ validity, and _____ validity, with reference to different purposes for which evaluation results are used in schools.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : validity; content; predictive;
concurrent; construct

Let us now try to see what other characteristics should we look for in selecting an instrument of evaluation.

61. We use various instruments of evaluation to measure the different aspects of the students.

For instance, we use an intelligence test to _____ the intelligence of a student.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : measure

62. Also, we know that measuring the intelligence of a student involves obtaining a _____ which indicate the student's intelligence.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : number or score

63. Thus, by using an intelligence test we obtain a number or score for each student.

And, we consider this _____ to indicate the intelligence of the student.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : score

64. In other words, we rely upon the score assigned to the student's performance on the test as the indicator of his intelligence.

Similarly, suppose we have administered an achievement test in Mathematics and we find that the student gets a score of

60. Then, again, we _____ upon this score to indicate the actual amount of learning that has taken place in the student.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : rely

In other words, we consider this score of 60 obtained by the student to be a reliable indicator of his actual test performance.

65. As we know, it is based on this score that we finally evaluate the student's learning.

Thus, for proper evaluation it is necessary that the scores obtained by the students on the test are _____.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : reliable

66. When the score obtained through a test is reliable, we say that the test is _____ or that the test has _____ity.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : reliable; reliability

67. Or, in general, we may say that an instrument of evaluation is considered to have reliability if the results obtained through it are reliable for indicating actual amount of change in the particular aspect of development of the student.

Thus, another essential characteristic of a good evaluation instrument is that it should have _____.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : reliability

Suppose, we have assigned scores to the students based on their performance on a test. But, how far can we rely upon these scores? In other words, can we take the score obtained on a test to be always reliable?

Before answering this question, let us first recall how we obtain a total score on the test for each student which represents his actual amount of learning.

68. We know that the student's answers to the questions in a test are taken to represent the actual _____ outcomes. We measure these outcomes by assigning _____ to them. And, the sum of these numbers is the total score for the student which is considered to specify the actual _____ of learning.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : learning; numbers; amount

69. From the above frame it is clear that the total score is based on the answers given by the student to the various questions in the test.

Thus, the total score of a student will represent the actual amount of learning if their answers can be taken to represent _____ outcomes.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : actual learning

-
70. Therefore, we can consider a test or a student's score on a test to be reliable if the _____ given by the students to the test questions represent _____ learning in them.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : answers; actual

71. Suppose in a test several of the questions are such that the students may simply answer them by guessing. And, by chance a student gets almost all his guesses correct and thereby he gets a total score of 65.

Can we consider this test to be reliable?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : No

72. Obviously, we cannot consider it to be a reliable test, because a part of the total score we have got does not represent actual learning in the student.

In fact, student's score on the test is not reliable because during the measurement of learning we have made an error by giving marks to answers which do not represent _____ in the student.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : actual learning

73. Suppose in another case a student knows answers to all the questions. But, the language used in the question is such

that he can not understand what he has to do. Thus, he writes wrong answers and gets a low score on the test although he knows answers to all the questions in the test.

Again, the student's score does not represent the _____ of learning as it does not include the amount of learning corresponding to those questions which he did not answer properly although he knew the answers.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : actual amount

74. In this case also, we may observe that the student's score is not reliable because of the _____ involved in the _____ of learning.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : error; measurement

75. Thus, in both the cases the score on the test was not reliable because of the errors involved in the measurement.

But, it may be noted that in both the cases, the errors of measurement were brought in by the nature of the _____ itself.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : test

76. Thus, a test is said to possess reliability to the extent the scores obtained through it represent _____ of learning in the students and they are not due to the _____ of _____ brought in by the nature of the test.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : actual amount; error of measurement

77. Suppose you have got the total score of a student on a test. Now, you want to check whether the score is reliable or not, i.e., you want to check whether there is any _____ of _____ involved in obtaining the scores or they represent the _____ of learning in the students.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : error of measurement; actual amount

Thus, we have to check whether we have gone wrong in the measurement of learning.

78. Consider the following instance. Suppose, you have multiplied two large numbers, and got their product. Now, you want to check whether you have gone wrong in the multiplication, i.e. whether the number obtained by multiplication is the actual product.

Obviously, a simple way would be that you do the multiplication _____. You may consider that there was no error involved in multiplication if the product obtained through remultiplication is the _____ as the one obtained earlier.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : again; same

79. On the same lines, in order to check whether any error of measurement is involved we may measure the learning again.

That is, if we have got a set of scores on the test,
 we may check whether ^{they are} reliable or not by getting another
 _____ by giving the test _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : set of scores; again

80. And, we consider the test to be reliable if the scores
 obtained through the test and the retest situation are
 the _____.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : same

81. In other words, a test is considered to be reliable if the
 scores obtained through it are consistent when administered
 at two different times.

Thus, the reliability of a test is _____cy of the
 scores obtained through it over a period of _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : consistency; time

82. As the reliability of a test is here checked by comparing
 the scores obtained through test and a retest situation,
 it is referred to as _____-_____ reliability.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : test-retest

We may look to the reliability of a test from a different point
 of view also.

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83. Consider an achievement test in Mathematics consisting of several problems. Suppose one of the problems is : "Add 283 and 386" which corresponds to the objective : Student adds three digit numbers correctly. Now if the student's answer represents the actual achievement of the objective then the student must also be able to solve an alternate problem of the same type.

Similarly, suppose we develop a test with an alternate problem to each problem on the first test. That is, we develop an equivalent form of a test. Then, we expect the scores of the students on the two forms to be _____.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : same

84. In other words, if the student's score on a test represent actual learning in him then he should get a similar _____ on an _____ form of the test.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : score; equivalent

85. Thus, a test may be considered as reliable if the scores obtained are consistent over two equivalent forms of the test.

That is, here, reliability is specified in terms of _____cy of scores over two equivalent forms of the test.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : consistency

-
86. Thus, we noted two types of consistency of a test score which tell us about the _____ of the test.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : reliability

87. As we have already noted all the questions in a test together try to measure learning related to a particular aspect. Therefore, if we split the test into two halves, they would represent two equivalent forms. And, each of them will still be measuring the _____ aspect.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : same

88. Thus, if the scores on the two halves of the test are separately taken and compared, we should find that each score should represent the _____ amount of learning related to the particular aspect being measured.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : same

89. This implies that the total scores of the students on each half should be consistent.

Thus, here, the reliability of the test is specified in terms of the _____ of scores over two halves of the same test.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : consistency

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90. As, in this case, reliability is checked by splitting the test into two and considering the scores on each half, it is referred to as _____-_____ reliability.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : split-half

91. It may be noted that in all the three approaches of checking the reliability, a test's reliability is specified in terms of the _____ of scores obtained through it.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : consistency

92. Thus, we have noted another essential characteristic of a good instrument of evaluation, namely, reliability.

An instrument of evaluation is considered to possess _____ if the information obtained through it represents actual amount of the particular aspect that is being measured through it and is not affected by the errors of measurement.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : reliability

93. Thus, the reliability of an instrument of evaluation decreases as the information obtained through it becomes less reliable due to the _____ of _____.

(Write the missing words in the above sentence)

The correct answer is : errors of measurement

Thus far, we have learnt about two characteristics of a good instrument of evaluation, namely, validity and reliability. Now, let us try to learn about a third characteristic that we should look for in selecting a particular instrument of evaluation.

94. As we noted earlier a student's total score on a test should be based on his answers which represent the actual learning outcomes.

Under reliability we discussed how, sometimes, this score may not be a reliable indicator of the actual _____ of _____ in the student if his answers do not represent _____ in him.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : amount of learning; actual learning

95. In other words, when the student's answers do not represent actual learning outcomes, the amount of learning indicated by the student's total score may be greater or less than the _____ of learning in him.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : actual amount

96. Suppose a teacher has conducted a test and he is checking the answers and assigning marks to them.

Now, although it is the teacher who assigns the marks, a student's marks on the test should depend only upon the _____ he has given and not on the _____ who is scoring them.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : answers; teacher or scorer

97. When the student's score on a test is based only on the student's _____ and not on the _____ who is scoring, we say that the scoring is objective.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : answers; scorer

98. We have already noted that the total score should always be based only on the student's answers.

Therefore, we may say that if a student's score has to represent the actual amount of learning then the _____ of answers on the test should be _____. That is, _____ity in scoring is essential for proper evaluation.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : scoring; objective; objectivity

99. Suppose a test has been administered to a student. And, several competent teachers have checked and scored the answers, independently. Also, suppose that the scoring done is objective in all the cases.

Then, in all the cases the total score assigned to the student should remain the _____. That is, the total scores assigned by different scorers should be consistent.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : same

100. In other words, objectivity in scoring may be considered as _____cy in scoring by _____ but equally competent scorers.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : consistency; different

101. Now, consider the following instance of testing. Let one of the questions in a test be : 'Discuss in detail the meaning of the term 'Reliability of a test' : Suppose, several equally competent teachers have independently scored a student's answer which contains several important points about the meaning of 'Reliability of a test'.

Can we always be sure that different teachers would assign the same marks to this answer?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : No

102. Obviously, our experience would suggest that we cannot expect the different teachers to give same marks for an answer to such a question. That is, scoring of answers to such a question may not be objective.

But, why do different teachers assign different marks to the same answer?

(Write your answer in a sentence in the answer sheet)

You are right if your answer is similar in meaning to the following.

Because, teachers differ in their opinion about the correctness or suitability of the answer given by the student.

103. Thus, we may observe that in this case the scoring is not objective because, it is based not only on the student's _____ but also on the _____ of the teacher who is scoring them.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : answers; opinion

104. Suppose, the same set of teachers are scoring the same answer in another situation. Here, the same answer has been given with reference to the following question :
 "Explain in about 8-10 lines the meaning of 'Reliability of a test'. What are the different types of validity? Specify each type in 4-5 lines."

Do you think that the scores assigned by different teachers would differ so much as in the earlier situation?

(Write 'Yes' or 'No') in the answer sheet)

The correct answer is : No

105. Thus, we may say that the same answer has been scored more objectively in this situation.

Why is it that the teachers do not differ much in scoring the answer in this situation?

(Write your answer in a sentence) in the answer sheet)

You are right if your answer is similar to :

Because, the question, in this case, clearly specifies the correct or suitable answer that should be expected.

106. It may be observed that the same answer was not scored objectively, earlier, as in that case, the question did not specify the exact answer to be expected.

Thus, we may say that objectivity in scoring depends upon the nature of the _____ in the test.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : question

When the questions in a test are such that the scoring of the answers can be objective we say that the test is objective; or, that the test has objectivity.

107. We said that scoring of a test can be considered as objective if the total score of a student is based only upon his answers and not on the opinion of the scorer.

Thus, we may define the _____ of a test as the extent to which a student's score on it is based on his actual _____ or performance on the test and not on the _____ of the scorer.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : objectivity; answer; opinion

108. We noted that for proper evaluation, scoring should be done objectively. We also found that objectivity in scoring depends upon the nature of the test.

Thus, we may say that _____ is an essential characteristic of a good test.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : objectivity

109. Or, we may say, in general that _____ is an essential characteristic of a good instrument of evaluation.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : objectivity

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110. An instrument of evaluation may be considered as _____ to the extent results obtained through it depend upon the actual information provided by the student and not on the _____ of the person who is using it.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : objective; opinion

111. In fact, we may note that results obtained through certain instruments such as rating scale, check list, etc. are always influenced by the opinion of the observer. Even under testing, we cannot expect objectivity in scoring of answers to essay type questions.

Thus, we may note that certain instruments of evaluation are less _____ by their very nature. And, they may be selected for use only if a mere _____ instrument is not available or if no other instrument serves the specific purpose.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : objective; objective

112. We observed that objectivity in scoring refers to the consistency in the scores assigned by different teachers.

Thus, we may, in other words, say that objectivity of a test is the _____ in the scores assigned to the answers on it by different scorers.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : consistency

113. We may recall that reliability is defined in terms of the consistency of scores. And, objectivity refers to the consistency among different scorers in assigning scores to answers on a test.

Thus, objectivity is also referred to as inter-scorer

_____.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : reliability

114. Thus, we have noted three essential characteristics of a good instrument of evaluation. The three characteristics are

- 1.
- 2.
- 3.

(Specify the three characteristics in the answer sheet)

The correct answer is : 1. Validity
2. Reliability
3. Objectivity

Although we have identified these characteristics separately, it should be remembered that we have to look for all the three characteristics in every instrument we choose for use in the schools.

Therefore, let us try to see whether these three characteristics exist in an instrument independently as separate qualities or they are related to each other. We shall try to answer certain specific questions as : 'Can we have an instrument which is perfectly valid, perfectly reliable and perfectly objective? Can a tool be valid without being reliable and objective?

Let us first, recall the meaning of the three characteristics that have been identified. Various evaluation instruments can be used in the schools for obtaining information about changes in different aspects of development of the students. Some of these like intelligence test, personality inventory, etc., may be readily available and the teacher has only to select the proper one. Certain others such as achievement tests, checklists for observation, questionnaire for getting special information, etc. have to be prepared by the teacher himself.

115. In any case, before using a specific instrument for evaluating the student, the teacher has to obtain satisfactory answers to certain basic questions about results that would be obtained through that instrument. These questions are :

- (a) Will they serve the purpose for which I want to use them?
- (b) Will they tell me the actual change in the particular aspect of the student?
- (c) Will they be influenced by my personal opinion?

These questions, in fact, correspond exactly to the three characteristics, We should look for in the instrument, viz.,

- (a) _____
- (b) _____
- (c) _____

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : (a) Validity
(b) Reliability
(c) Objectivity

116. Thus, recalling what we have learnt, we may state that the _____ of an instrument of evaluation is the extent to which the results obtained through it serve the specific purpose for which they are to be used.

_____ of an instrument is the extent to which information obtained through it represent the actual amount of change in the student and is not influenced by errors of measurement.

And, _____ of an instrument is the extent to which the results would be based only on the actual information obtained and not on the opinion of the person using it.

(Write the missing words in the above sentences in the answer sheet)

The correct answer is : Validity; Reliability; Objectivity

117. It may be observed that each of the above terms has been defined as the _____ to which the respective characteristic is possessed by a particular evaluation instrument.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : extent

118. Thus, when a teacher tries to know about an instrument's validity, reliability and objectivity, he would, in fact, be finding out the _____ to which the particular instrument is _____, _____ and _____.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : extent; valid; reliable; objective

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119. The above fact indicates that any instrument of evaluation would be valid, reliable and objective only to a particular _____ which may be high or low.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : extent

120. Let us now try to answer the question we started with.

Can we have an instrument which is perfectly valid,
perfectly reliable and perfectly objective?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : No

121. For instance, suppose that an achievement test has been prepared with utmost care and the teacher wants to use it for determining the extent to which specific objectives of the course have been achieved. But, we know that the questions in the test would correspond to only a sample of the total set of objectives. Thus, the test does not serve the purpose as regards to those objectives which are not included in the sample.

Therefore, if proper care is taken the teacher may be able to prepare a highly valid test - but not a _____ valid one.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : perfectly

122. Similarly, we may find that an instrument can be made highly reliable and highly objective but it cannot be _____ reliable and _____ objective.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : perfectly; perfectly

In fact, we have already observed that some of the instruments of evaluation are less objective by their very nature.

123. Thus, we may say that when we look for these characteristics in an instrument, we have only to check the _____ to which they are in it; and, not whether the characteristics are possessed to a _____ extent.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : degree; perfect

124. Suppose that a test has been prepared for the purpose of determining student's achievement in a particular area. But, several of the questions in it are such that students may not be able to understand what they should write. That is, the student's score on the test cannot be considered to represent actual learning in him. In other words, the reliability of the test is low.

Can the results of this test serve the purpose for which they are to be used?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : No

125. Since the test results cannot serve the purpose for which they are to be used, we may say that the test is not highly _____.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : valid

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126. In fact, when the test is less reliable, the student's score on it is also less reliable, and does not represent actual learning in him. Therefore, naturally, the score cannot be taken as a highly valid indicator of student's achievement.

Thus, if the _____ of a test is low then its validity will also be _____. We may also say that if a test has high validity it would imply that it has _____ reliability also.

(Write the missing words in the above sentences in the answer sheet)

The correct answer is : reliability; low; high

127. On the other hand, suppose that we know that an achievement test's reliability is high. But, we do not know whether the questions in the test correspond to a representative sample of objectives of the complete course. That is, we do not know about the test's validity.

Since the reliability of the test is high can we assume that its validity will also be high?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : No

This is because it is quite possible that the test questions do not represent certain content areas at all.

128. Thus, we have found that if a test is highly valid it implies that it is _____ reliable also. But, the high reliability of a test does not ensure its _____ validity.

(Write the missing words in the above sentences in the answer sheet)

The correct answer is : highly; high

129. Again, suppose that the test questions are such that the answers cannot be scored objectively. That is the test's objectivity is low.

Can the results obtained through such a test serve the purpose of measuring student's achievement well?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : No

130. This indicates that if the objectivity of a test is low then its validity will also be _____.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : low

131. From the above observations it is clear that for a test to be valid it must be _____ and _____. But, reliability and objectivity of a test do not tell us anything about its _____.

(Write the missing words in the above sentences in the answer sheet)

The correct answer is : reliable; objective; validity

132. While discussing about objectivity we noted that both objectivity and reliability of a test refer to the extent to which the total score of a student remains _____ under different conditions.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : consistent

133. Thus, in a way, we may consider objectivity also as a type of _____ which refers to the _____ of scores assigned by different persons.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : reliability; consistency

134. In the light of the above discussions we may say that the three essential characteristics of a good instrument, viz., _____, _____ and _____ are not separate qualities and are _____ to each other.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : validity; reliability; objectivity; related

135. We learnt that the validity of an instrument of evaluation depends upon its reliability and objectivity. And, therefore, a valid instrument would always be _____ and _____. But, at the same time, reliability and objectivity of an instrument do not guarantee its _____.

(Write the missing words in the above sentences in the answer sheet)

The correct answer is : reliable and objective; validity

136. We also noted that both characteristics, reliability and objectivity, related to the same aspect of measurement,

namely, _____ in scoring. And, that is why,
objectivity is also referred to as inter-scorer
_____.

(Write the missing words in the above sentences in the answer sheet)

The correct answer is : consistency; reliability

137. Suppose that the teacher has chosen a tool taking into consideration all these three characteristics. But, an important question would be whether the tool is usable in the school situation.

Thus, while selecting a particular evaluation tool, apart from the three essential characteristics we should also consider the _____ity of the tool in the school situation.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : usability

Usability of a test refers to various practical aspects of the evaluation process that should be considered. Particularly in our schools with limited resources consideration of this factor becomes essential.

We shall try to note in the following different practical aspects that should be considered while choosing an evaluation instrument.

138. Some tests would require the user to have got proper training in administering them. Thus, if the schools do not have properly trained people, administration of such tests may not be possible. Thus, ease of administering the test has to be considered while selecting it for use.

Therefore, we may say that _____ of _____
is a practical aspect which we should consider in
choosing specific instruments of evaluation.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : ease of administration

139. As we know, except for achievement testing, evaluation is, generally, not considered as a part of the day to day school schedule. Thus, the time requirement for the preparation and use of particular tools have to be borne in mind while selecting them for use.

Thus, _____ required for administration is another practical aspect to be considered in choosing an instrument.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : time

140. Again, certain tests such as projective techniques, certain personality measures involve special and somewhat complicated scheme of scoring. This, again makes ease in scoring as one of the important practical aspects.

Therefore, we may say that another important practical aspect under usability is the _____ of _____ the test.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : ease of scoring

Alongwith the above, another factor we should consider, in view of the limited resources in our schools, is the cost factor involved in using specific evaluation instruments.

141. Thus, we have noted that apart from the three characteristics viz., validity, reliability and objectivity we should also consider the _____ of the instrument while selecting it for use.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : usability

142. Further, we noted that usability refers to various practical aspects such as ease of _____, _____ of _____, _____ requirement, _____ involved etc.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : ease of administration; ease of scoring; time; cost

Thus, it may be concluded that the essential characteristics we should look for while choosing a particular instrument of evaluation are : (1) validity, (2) reliability, (3) objectivity, and (4) Usability.

IV. Major Evaluation Tools and Their Uses

We learnt in the previous sections that a variety of tools are available to the teacher for the purpose of evaluating the students. And, it is through these tools that different techniques of evaluation are applied in the evaluation process.

In this section, we shall try to know about the major tools of evaluation that come under the three main techniques of evaluation used in the schools. Thus, we shall try to answer the question

--- What are the major tools of evaluation used in the schools?

We learnt in the last section that these tools of evaluation differ in their characteristics and the teacher has to choose the proper ones which satisfy his requirements. In fact, we noted that certain tools, by their very nature, are less objective. Thus, we shall try to know, in brief, about the nature of the different tools of evaluation. In other words, we shall try to answer, in brief, the question

--- What are the characteristics of the different tools of evaluation?

We also noted that different instruments of evaluation have to be used for evaluating different aspects of development of the student. And, the teacher has to select or prepare tools suitable for evaluating specific aspects of development. In this connection we shall try to see the suitability of specific tools of evaluation for the evaluation of particular aspects. Thus, we shall try to answer the question

--- What are the uses of the different tools of evaluation?

The different tools of evaluation can be categorised under the three main techniques of evaluation. We shall discuss them, accordingly, under three main heads, namely, testing techniques, observational techniques, and self-reporting techniques.

-
1. Evaluation of any aspect of development of the student requires that we obtain relevant and accurate information about the particular aspect.

In fact, it is based on this _____ that we finally judge whether changes in the particular aspect of development are satisfactory or not.

(Write the missing word in the above sentence)

The correct answer is : information

2. We have also noted that three main procedures are adopted in schools for obtaining this information. These procedures are represented by the three _____ of _____ used in the schools.

(Write the missing words in the above sentence)

The correct answer is : techniques of evaluation

3. Further, these techniques of evaluation are applied in the evaluation process with the help of different _____ of _____.

(Write the missing words in the above sentence)

The correct answer is : instruments of evaluation

Thus, different tools of evaluation may be classified under these three techniques of evaluation.

However, it should be noted that this classification is not very rigid. Certain instruments may be used under more than one technique of evaluation.



Another important point is that the tools need not be always represented by materials like tests, rating scales, or questionnaires, etc. Rather each tool represents a specific procedure of obtaining information under the particular technique.

Thus, a tool and a technique may not be considered as two separate things.

-
4. For instance, conducting an interview for understanding the student's problems is a specific procedure used under the category of self reporting techniques.

But, in the interview you may not use any _____ like a test, a rating scale or a questionnaire.

(Write the missing word in the above sentence)

The correct answer is : material

-
5. Thus, we may say that in certain situations, techniques of evaluation may be directly applied without the help of any _____ such as test, questionnaire, etc.

(Write the missing word in the above sentence)

The correct answer is : material

In our discussion about tools under different techniques of evaluation, we shall discuss about these types of specific procedures also.

-
6. As we said earlier we may discuss about the different instruments of evaluation, as they fall under the three techniques of evaluation which represents the main _____ of obtaining _____ for the evaluation of the different aspects of development of the students.

(Write the missing words in the above sentence)

The correct answer is : Procedures; information

7. We know that information for evaluation may be obtained by requiring the student to perform a given set of tasks. Products of the tasks performed would provide the information needed for evaluation.

This procedure of obtaining information for evaluation represents the _____ of _____.

(Write the missing words in the above sentence)

The correct answer is : technique of testing

In the following frames we shall learn about different tools or methods adopting the technique of testing.

8. We may observe that in this technique the first step is to get the student perform certain _____, and then to obtain the needed information for evaluation from the _____ of the task performed.

(Write the missing words in the above sentence)

The correct answer is : tasks; products

9. We know that tasks can be of different types. Accordingly, the products of different types of tasks will also be in _____ forms.

(Write the missing word in the above sentence)

The correct answer is : different

-
10. For instance, we ask a boy in the craft class to prepare a card board box.

Here, we may say that the student is required to perform the _____ of preparing the box.

(Write the missing word in the above sentence)

The correct answer is : task

11. It may be observed that this task involves the manipulation of certain objects like cardboard pieces.

Further, products of the task carried out will also be in the form of an _____, namely, cardboard box.

(Write the missing word in the above sentence)

The correct answer is : object

12. Thus, in this instance, the task is of a particular type which involves _____ of objects. This results in a product which is also, generally, in the form of an _____.

(Write the missing words in the above sentence)

The correct answer is : manipulation; object

13. Let us consider another instance, the teacher asks the students to write an essay.

In this case, the students are required to perform the task of _____ an essay. And, the product of the task will be in the form of _____ material.

(Write the missing words in the above sentences)

The correct answer is : writing; written

14. In this case, the task is of a particular type which involves _____ certain things resulting in a product which is also in the _____ form.

(Write the missing words in the above sentence)

The correct answer is : writing; written

15. Suppose a teacher in the elementary school is teaching spelling. He calls out a word and asks a student to spell out the word orally.

Can we say that the student is asked to perform a task?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : Yes

The task to be performed is spelling out the word orally.

16. It may be observed that in this case the task is carried out _____. Also, the student's answer, which is the product of the task is in the _____ form.

(Write the missing words in the above sentences)

The correct answer is : orally; oral

17. Thus, this instance represents a type of task which is carried out _____ and also results in a product in the _____ form.

(Write the missing words in the above sentence)

The correct answer is : orally; oral

From the above illustrations, we find that at schools we may require the student to perform different types of tasks resulting in products of different forms.

18. As we have noted the testing technique only specifies that certain _____ should be performed resulting in certain _____ which (the product) may be, then, used as the basis for evaluation.

(Write the missing words in the above sentence)

The correct answer is : task; product

19. Therefore, we can have _____ types of testing procedures involving different types of tasks resulting in products of different forms.

(Write the missing word in the above sentence)

The correct answer is : different

20. In other words, we can classify different types of tests on the basis of the nature of the _____ to be performed and the _____ of the resulting product.

(Write the missing words in the above sentence)

The correct answer is : task; nature

We may observe that the three illustrations discussed above represent three types of tasks and corresponding product forms. Accordingly, we may classify the tests into three types.

Let us examine the three illustrations again and see the three types of tests represented by them.

21. Consider the illustration about teaching of spelling.

Here, we have noted that the student is required to give _____ answers.

(Write the missing word in the above sentence)

The correct answer is : oral

22. Suppose, in this case, the teacher evaluates the student's proficiency in spelling by considering the oral answers (i.e. the product).

Can we say that the teacher is applying the testing technique?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : Yes

23. Obviously, it is testing as it involves the performance of a task resulting in certain product on the basis of which the student is evaluated.

Tests of this type where the students are required to give oral answers (i.e. to perform an oral task) and evaluation is done on the basis of these oral answers (products) are called _____ tests or examinations.

(Write the missing word in the above sentence)

The correct answer is : oral

-
24. Let us, now consider the illustration about writing an essay. Here, the student is required to give _____ answers.

(Write the missing word in the above sentence)

The correct answer is : written

25. Again, suppose that the teacher evaluates the student's knowledge related to the topic of the essay on the basis of his written answer (the product).

Then, we may say that the teacher is using the _____ technique for the evaluation of the student.

(Write the missing word in the above sentence)

The correct answer is : testing

26. Tests of this type where the students are required to give written answers (i.e. to perform the task of writing answers) and the student is evaluated on the basis of these written answers (products) are called _____ tests or examinations. These are also called paper-pencil tests.

(Write the missing word in the above sentence)

The correct answer is : written

27. We noted earlier that tests are classified into three types on the basis of the nature of tasks to be performed and the resulting products. Of these we have already discussed about two types of tests. These two types are :

1.

2.

(Specify the two types in the answer sheet)

The correct answer is : 1. Oral tests
2. Written tests

28. Let us, now, consider the other illustration which we have noted, earlier.

We observed that, in this case, the task to be performed by the students involves the _____ of certain _____ resulting in products which are also in the form of objects, namely, cardboard boxes.

(Write the missing words in the above sentence)

The correct answer is : manipulation; objects

29. Here, also, if the teacher evaluates the student's ability on the basis of the cardboard boxes prepared by him, we may say that the teacher is using the _____.

(Write the missing words in the above sentence)

The correct answer is : testing technique

This type of tests are known as 'performance tests'.

30. It may be noted that in the other two situations, viz., oral tests and written tests, the task involves the manipulation of words. In other words, it involves manipulation of verbal material.

On the other hand, in the present situation, the task involves the manipulation of objects, i.e., the manipulation of non-_____.

(Write the missing words in the above sentence)

The correct answer is : non-verbal material

31. Also, the product in the situations of oral and written tests is in terms of words, i.e. the products were verbal material.

On the other hand, product in the present situation is in terms of objects, i.e., in terms of _____ - _____ material.

(Write the missing word in the above sentence)

The correct answer is : non-verbal

32. Further, in oral and written tests, the tasks do not involve much of physical or motor activities.

But, in the case of performance tests the tasks, mainly, involve physical or _____ .

(Write the missing words in the above sentence)

The correct answer is : motor activities

33. Thus, we may say that performance tests are those wherein the tasks to be performed by the students require _____ of objects, i.e. _____ - _____ material and involves _____ to a great extent.

(Write the missing words in the above sentence)

The correct answer is : manipulation; non-verbal;
motor activities.

-
34. We may note that these three types of tests are not specific instruments of evaluation. Rather, they simply represent three _____ by which technique of _____ may be adopted in different evaluation instruments.

(Write the missing words in the above sentence)

The correct answer is : procedures; testing

35. Further these procedures are specified in terms of the nature of the tasks involved in the test.

Thus, any test in which all tasks are to be carried out orally may be called an _____ test.

(Write the missing word in the above sentence)

The correct answer is : oral

36. In other words, an achievement test in a particular subject which adopts oral testing procedure may be considered as an oral achievement test. Or, by changing the procedure (i.e., nature of the task involved) to writing we may have a _____ test of achievement.

Similarly, a test of intelligence in which all the items require the manipulation of certain objects (i.e., all are performance items) may be called a _____ test of intelligence.

(Write the missing words in the above sentences)

The correct answer is : written; performance

-
37. However, this does not mean that a test should always consist of tasks of only one type.

Instead, depending upon the suitability of particular procedure for the specific aspect, a test may involve more than one procedure of _____.

(Write the missing word in the above sentence)

The correct answer is : testing

38. For instance, certain tests of intelligence consist of items involving tasks of all the three types, namely, _____, _____, and _____.

(Write the missing words in the above sentence)

The correct answer is : oral; written, and performance

39. Also, we may come across two tests for evaluating the same aspect but adopting two different procedures of testing.

For instance, for questions in achievement tests we may obtain answers from the students both in the _____ and in the _____ forms.

(Write the missing words in the above sentence)

The correct answer is : oral; written

And, the teacher has to select the appropriate procedure by considering the purpose and certain practical aspects.

-
40. As we know, written examination requires certain level of mastery in reading and writing on the part of the

students. This, naturally, we cannot expect for children at the early stages of education.

Therefore, for evaluating students in lower classes we have to adopt _____ testing procedures.

(Write the missing word in the above sentence)

The correct answer is : oral

41. Another use of oral testing is that during the course of classroom work the teacher can conveniently evaluate the students through _____ testing.

(Write the missing word in the above sentence)

The correct answer is : oral

42. While examining orally, there is possibility for changing or rewording the questions. Therefore, through further questioning, teacher can follow the thinking process in a student when he fails to answer certain questions. This helps the teacher in diagnosing students' problems in learning.

Thus, oral tests have special value as tools for the _____ of learning difficulties of the students.

(Write the missing word in the above sentence)

The correct answer is : diagnosis

43. For evaluating through oral testing, each individual will have to be tested separately. Therefore, it is much time consuming and less practicable.

Thus, for evaluating large groups of students _____
tests are more suitable than oral tests.

(Write the missing word in the above sentence)

The correct answer is : written

44. Moreover, bu the very nature of the procedure, when oral tests are used as tests of achievement, scoring of students' answers is easily influenced by the examiners' opinions.

Thus, oral tests are, in general, less _____.

(Write the missing word in the above sentence)

The correct answer is : objective

45. Apart from being less objective, in the procedure of conducting oral examinations, several important aspects such as the questions to be asked, time for which each student should be tested, etc., are not specified before hand. The examiner is free to change these things for different students. Because of this nonspecific nature of the procedure, the results of oral tests become less reliable.

Thus, in general, oral examinations are considered to have low _____.

(Write the missing word in the above sentence)

The correct answer is : reliability

-
46. We may, therefore, conclude that unless the procedure of conducting oral examinations, and the procedure of scoring students' answer in them are made highly specific, oral examination results are quite un_____.

(Write the missing word in the above sentence)

The correct answer is : unreliable

47. But, this in no way implies that written tests of achievement are always more objective and reliable. In fact, written tests with only essay questions may also be less _____ and less _____ to an equal extent as the oral tests.

(Write the missing words in the above sentence)

The correct answer is : objective; reliable

The above discussions regarding tests, as we noted earlier, was only in terms of different testing procedures and not in terms of tools of evaluation.

48. As we know, different tests (which are the tools of evaluation under testing technique) have to be used for different purposes of evaluation.

Therefore, we may classify tests into specific types, considering specific _____ for which they are used in schools.

(Write the missing word in the above sentence)

The correct answer is : purposes

-
49. As we have already discussed, tests are most commonly used in schools for the purpose of determining students' _____ in specific content areas of different school subjects. Tests used for this purpose are, therefore, called _____ tests.

(Write the missing words in the above sentences)

The correct answer is : learning or achievement; achievement

50. Generally, we consider, achievement in school subjects in relation to the instruction provided at the school. Therefore, a test of achievement may also be considered in relation to the instruction provided.

Accordingly, an achievement test used in a particular school is generally made by the concerned teacher himself.

These tests prepared by the teacher himself are called _____ achievement tests.

(Write the missing words in the above sentence)

The correct answer is : teacher made

51. Results of these teacher made tests, therefore, indicate students' _____ only in relation to the _____ provided in the particular schools.

(Write the missing words in the above sentence)

The correct answer is : achievement; instruction

52. We know that evaluation comes not merely at the end of instruction.

It is a _____ process appearing at all stages of providing instruction.

(Write the missing word in the above sentence)

The correct answer is : continuous

53. Thus, teachers test students' achievement, periodically, at various stages of providing instruction.

Results of these tests provide information regarding the extent to which all the _____ of a particular content area have been achieved.

(Write the missing words in the above sentence)

The correct answer is : specific objectives

Results of these tests are of great help in improving the instruction. As we have already noted, they are useful to teacher and students in various ways. They help the teachers in understanding their students, in taking proper decisions about teaching, and testing the effectiveness of their own teaching. They motivate the students towards further learning and lead them towards self-evaluation.

54. In addition to this type of tests, teachers, also prepare and use comprehensive tests of achievement.

This type of test is used to measure students' _____ as related to a complete _____.

(Write the missing words in the above sentence)

The correct answer is : achievement; course

55. Marks obtained by students on these tests are interpreted by the teachers to give ranks and _____ to the students as A, B, C, etc., i.e. consider them as good, average, etc. which will be the basis for deciding about promotions.

(Write the missing word in the above sentence)

The correct answer is : grades

Let us consider an illustration and see what these grades and ranks really imply.

56. Suppose a test in history has been administered by a teacher. After scoring the answers, he finds that majority of the students have got between 50 and 60 marks out of a total of 100. Only a few, say 7 - 8 students, have scored above 60, with 68 as the highest score.

Naturally, he would consider those students who have scored above 60 marks as _____ or above average, those with marks between 50 and 60 as _____ and so on. The student with 68 marks would be ranked as the best student.

(Write the missing words in the above sentence)

The correct answer is : good; average

57. We may observe that the teacher considered the level of achievement of the student with 68 marks as the best as it is the highest score obtained in the group. Similarly, students with more than 60 marks were considered as good by considering the general performance of students of the particular group or class.

Grades or ranks as average, good, best, etc., are considered in relation to the performance of the _____ of students for whom it has been prepared.

(Write the missing words in the above sentence)

The correct answer is : particular group

58. In other words, interpretation of scores on a teacher made test as good, very good, average, etc., is done with reference to the performance of the _____ of students for whom it has been prepared.

(Write the missing words in the above sentence)

The correct answer is : particular group

Let us consider another aspect of achievement testing. Although, instruction provided differs from school to school, we generally, expect students of a particular age group or class to possess some general level of achievement in different school subjects, such as languages, arithmetic, science, history, etc.

Further, we expect to find students of different achievement levels, who can be considered as good, average, etc., in relation to the general achievement level of the whole group of students belonging to the particular age group or class.

-
59. For instance, we may like to know the average achievement level in Mathematics of all students of age 8 to 9 years. Also, we may like to know whether a particular student's achievement in Mathematics is average or above average, etc., in relation to the average achievement level of the whole group.

For this, we have to, first, obtain scores for all the students of the group which would indicate their achievement in Mathematics. We may, then, compare these scores to determine the _____ achievement level for the whole group, and also to _____ students as good, average, etc.

(Write the missing words in the above sentence)

The correct answer is : average; grade

Let us see whether we can use results of teacher made tests for the above purpose.

60. Suppose we have collected the scores and grades in Mathematics of a large number of students of the age 8 - 9 years on different teacher made tests administered in the respective schools. We noted that for our purpose we have to compare these scores and grades.

Can these scores and grades of different students be compared?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : No

We cannot compare these as they are results obtained through different teacher made tests.

This indicates that teacher-made tests cannot serve the purpose of studying achievement of students in large groups as the one we are considering.

In the following frames, we shall try to understand why results of different teacher made tests cannot be compared and what should

be the nature of the test if it should serve the present purpose of measuring the general achievement of students of particular age group or class, etc.

61. First of all, we may note that results of teacher made tests have to be considered in relation to the _____ provided at particular schools. Also, instruction provided may differ from school to school.

(Write the missing word in the above sentence)

The correct answer is : instruction

62. We know that instruction provided in any subject is based on the set of objectives specified for the subject.

Naturally, different teachers may consider _____ sets of _____ for the same course.

(Write the missing words in the above sentence)

The correct answer is : different; objectives

63. Thus, a test prepared by a particular teacher would represent a particular set of objectives.

In other words, results of different teacher made tests represent achievement related to different sets of _____.

(Write the missing word in the above sentence)

The correct answer is : objectives

64. Thus, we have found that teacher made tests cannot serve our purpose since, results of these tests cannot be compared as they do not correspond to a standard set of objectives.

This indicates that for the present purpose of studying the achievement level of students in relation to larger groups, we need a test measuring achievement related to a _____ set of _____ which are, generally, covered by the instruction provided in all schools.

(Write the missing words in the above sentence)

The correct answer is : standard; objectives

65. Another aspect we have to consider in this connection is differences in the accuracy of results obtained through different teacher made tests.

And, we know that accuracy of test results depend upon the extent to which the test possesses the three essential characteristics, namely, _____, _____, and _____.

(Write the missing words in the above sentence)

The correct answer is : validity, reliability and objectivity

66. We, also, know that these characteristics of a test depend upon the testing procedures adopted in it such as the procedure of administration, selection of specific items to be included in it, procedure of scoring, etc. And, different teacher made tests may adopt different testing procedures.

Thus, we may say that results obtained through different teacher made tests do not serve our purpose as these tests do not adopt standard _____.

(Write the missing words in the above sentence)

The correct answer is : testing procedures

-
67. This indicates that for measuring achievement of students in large groups as the one we are considering, we need a test which adopts _____ testing procedures.

(Write the missing word in the above sentence)

The correct answer is : standard

68. Suppose we have got teacher made tests which are based on standard set of objectives and adopt standard testing procedures. And, we have collected the grades of large number of students of age 8 - 9 years obtained on these tests in the respective schools.

Can we consider these grades to indicate the achievement level of the students in relation to the whole group of students of age 8 - 9 years?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : No

69. This is because, these grades have been given considering the average _____ of the students of particular groups in different schools.

(Write the missing word in the above sentence)

The correct answer is : performance

70. That is, we may say that different procedures may have been adopted in the interpretation of scores for different groups of students. For instance, in one group a score of 60 may be considered as good, while in another group it may be in the average level.

Thus, grades on different teacher-made tests cannot be compared as they may not adopt a standard _____ of _____ of scores.

(Write the missing words in the above sentence)

The correct answer is : procedure of interpretation

71. From this it is clear that we have to adopt a standard procedure of interpretation based on the information obtained about the general performance of all or a large number of students of the particular age group, viz., 8 - 9 years.

That is, we should have a test which adopts a _____ procedure for interpretation of scores.

(Write the missing word in the above sentence)

The correct answer is : standard

72. Thus, in order to study the general achievement level in various school subjects for large groups of students, such as all those belonging to a particular age group or class, we need a test with the following qualities.

1. It should be prepared with reference to a standard set of _____.
2. It should adopt standard procedure of _____.
3. It should adopt standard procedure for _____ of scores.

Tests of this type are generally known as _____ised tests of achievement.

(Write the missing words in the above sentences)

The correct answer is : objectives; testing; interpretation;
standardised

73. As we already noted, results of standardised tests of achievement provide a common basis for _____ the achievement of students of large groups without considering the _____ provided at the particular school.

(Write the missing words in the above sentence)

The correct answer is : comparing; instruction

74. Also, from a student's performance on a standardised test of achievement we can determine whether his _____ level is satisfactory or average, or above average, etc. with respect to the _____ level of the whole group being considered.

(Write the missing words in the above sentence)

The correct answer is : achievement; average achievement

75. Further, we can also identify children at the extreme, that is those who are very _____ and those who are very _____. Thus, it helps adjust the instructional programme to the needs of all the students.

(Write the missing words in the above sentence)

The correct answer is : dull; bright

76. We have learnt that for comparing the abilities of students irrespective of the instruction provided to them at schools we should use _____ tests.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : standardised

77. Also we noted that we cannot use teacher made tests for this purpose because of certain specific reasons. That is, we cannot compare results obtained through different teacher made tests because

- (i) These tests might not be prepared with reference to a standard set of _____.
- (ii) These tests may not adopt standard procedures of _____.
- (iii) These tests may not adopt a standard procedure for _____ of scores.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : objectives; testing; interpretation

78. Thus, we have come across two types of achievement tests. These are (i)
(ii)

(Write the missing words in the above sentence)

The correct answer is : (i) teacher made tests;
(ii) standardised tests

79. Achievement tests, about which we have discussed, are tests used for the _____ of determining _____ of students in relation to specific content areas.

(Write the missing words in the above sentence)

The correct answer is : purpose; achievement

Let us, now, consider tests with purposes other than measurement of achievement.

We shall consider the following illustration of testing and see the purpose for which testing has been used.

80. Suppose your mathematics teacher has taught the unit on 'addition, substraction, multiplication and division of decimal numbers'. In order to evaluate the pupils he gives a test consisting of problems on decimals. When he checks the answers of the pupils he finds that many of the pupils have gone wrong on particular items in the test. He further discovers that all these items involve 'multiplication of decimals'.

What does this situation indicate to the teacher about his pupils?

(Write your answer in one sentence)

You are right if your answer is similar in meaning to the following.

It indicates that pupils have difficulty in learning the multiplication of decimals.

81. The teacher gives a more detailed test consisting of only multiplication problems involving different types of decimals. Thus, the teacher is diagnosing the learning difficulties of the students.

We may say that, here, testing has been used for the purpose of _____ the learning difficulties of the students.

(Write the missing words in the above sentence)

The correct answer is : diagnosing

82. Tests used for the above purpose, namely, for diagnosing the learning difficulties of the students are called _____ tests.

(Write the missing word in the above sentence)

The correct answer is : diagnostic

83. We may observe that achievement tests provide information about student's _____ in different subjects. And, diagnostic tests tell us about the _____ of the student in _____ different subjects.

(Write the missing words in the above sentence)

The correct answer is : learning; difficulties; learning

We may observe that there is an important difference between general achievement tests and diagnostic tests, although both are related to classroom learning.

84. We may note from the illustration discussed above that through the general achievement test the teacher could identify only the general area, viz., multiplication of decimals, where the students had difficulty. But, to identify the specific point where the difficulty was, he needed a diagnostic test which was more detailed and dealt with only that particular topic.

Thus, we may say that diagnostic tests of achievement are more _____ but they cover only _____ topics of instruction. On the other hand, general achievement tests are _____ and they cover _____ the topics of instruction.

(Write the missing words in the above sentences)

The correct answer is : detailed; particular; not detailed;
all

85. As we know, merely diagnosing the illness of a person does not help. We should also provide remedial treatment to bring him to normal health.

Similarly, after diagnosing the difficulties of a student we have to provide _____ instruction to bring him to the general level of _____.

(Write the missing words in the above sentence)

The correct answer is : remedial; achievement

86. Thus, we may conclude that using a _____ test to identify the learning difficulties of the student should always be followed by _____ instruction.

(Write the missing words in the above sentence)

The correct answer is : diagnostic; remedial

As we can see, purpose of general achievement testing as well as of diagnostic testing is directly related to classroom learning in different subjects. In the following, we shall discuss two types of tests whose purpose is not directly related to classroom learning.

87. In classrooms and outside, we generally find some students who always learn better and more, adjust themselves to new situations faster, and can think and reason out abstract ideas more easily than other students.

We, generally, consider these students as _____
or bright students.

(Write the missing word in the above sentence)

The correct answer is : intelligent

88. Also, we may find some students who are always poor in all the subjects and cannot adjust to the home or school properly. These students are, generally, considered to be dull or un_____. And, we find the remaining large majority of students to be of average level in all the abilities.

(Write the missing word in the above sentence)

The correct answer is : unintelligent

89. The fact that students are different in their learning abilities, which can be easily seen to influence all aspects of development, implies that they need _____ types of programmes at the school.

(Write the missing word in the above sentence)

The correct answer is : different

90. Thus, a proper understanding of the above characteristic of the student is necessary both for teachers and for administrators.

With this knowledge they can _____ the classroom instruction and also activities in the school so that they suit the abilities of all the students.

(Write the missing word in the above sentence)

The correct answer is : adjust

91. We noted that during casual observation we find some students to be highly intelligent, some to be unintelligent and the remaining to be of average intelligence.

However, we cannot rely upon information obtained through such observation. Moreover, through such observation we cannot know how intelligent a student is; that is, we cannot specify the _____ of intelligence of the student.

(Write the missing words in the above sentence)

The correct answer is : actual amount

92. To know the actual amount or quantity of intelligence of a student would mean that we have to measure the intelligence.

Tests used to measure the intelligence of the student are called _____.

(Write the missing words in the above sentence)

The correct answer is : intelligence tests

93. We find that some tests of intelligence involve tasks which require the manipulation of words or language. Or, we may simply say that some intelligence tests involve the use of language or verbal material. And, some others involve the use of non-verbal material only.

Accordingly, we may classify intelligence tests into two types, namely,

(i) _____ tests of intelligence

(ii) _____ tests of intelligence

(Write the missing words in the above sentence)

The correct answer is : verbal; non-verbal

94. Also, we come across certain tests of intelligence which, mainly, require manipulation of objects and involve physical or motor activities on the part of the student being tested.

These tests which involve only performance items may be called _____ tests of intelligence.

(Write the missing word in the above sentence)

The correct answer is : performance

95. Thus, on the basis of the nature of the tasks involved we may classify intelligence tests into the following three types :

1.

2.

3.

(Specify the three types in the answer sheet)

The correct answer is : 1. Verbal tests
2. Non-verbal
3. Performance tests

96. We also find that certain tests of intelligence are to be administered to each individual ~~separately~~. And, certain others tests can be administered in a group.

Thus, on the basis of administration procedure, we can classify tests of intelligence into _____ tests of intelligence and _____ test of intelligence.

(Write the missing words in the above sentence)

The correct answer is : individual; group

We may note that through intelligence tests we try to measure students' general ability of learning. We also come across in schools certain students who may not be bright in all aspects, but are good in certain specific or special abilities such as musical ability, mechanical ability, etc. or in certain, specific subjects of study as languages, science, mathematics, etc.

97. In the same way, as in the case of general ability we find that different students possess different special abilities to different extent. These special abilities of learning are called aptitudes. And, tests used for the purpose of measuring the different special abilities are called _____ tests.

(Write the missing word in the above sentence)

The correct answer is : aptitude

98. There are various special abilities which may be musical ability, numerical ability, mechanical ability, etc. or may be ability in learning specific subjects such as language, mathematics, etc.

Accordingly, we have various aptitude tests such as _____ aptitude test, _____ aptitude test, _____ aptitude test, etc.

(Write the missing words in the above sentence)

The correct answer is : musical; numerical; mechanical

99. We should note that these aptitudes are not directly dependent on the classroom learning.

Therefore, by knowing the aptitude of a student we can know the particular work or _____ of study which the student can learn well at present and also, will succeed in the _____ when he takes up a job or higher studies.

(Write the missing words in the above sentence)

The correct answer is : subject; future

100. This indicates that through results of aptitude tests we can not only know the present abilities of the student but we can also _____ his success in future learning or work.

(Write the missing word in the above sentence)

The correct answer is : predict

101. Many times we find students taking up certain special subjects of study in the lower classes, but finding later on that they cannot learn them well. Similarly, some get trained for particular jobs based on the subjects they have studied and find that they cannot do well when they actually take up the job or vocation.

In order to avoid these situation, we may guide the students in the schools by knowing their _____ which tell us the particular subjects or vocations in which they would succeed in the _____.

(Write the missing words in the above sentence)

The correct answer is : aptitudes; future

Thus, aptitude tests have special value for providing educational and vocational guidance to the students.

102. Thus, under testing we noted three types of tests considering the nature of the task involved, i.e. on the basis of whether the task is called out orally, or whether it requires written response, or whether it involves manipulation of objects and motor activities.

These types are : 1. _____ tests
 2. _____ tests
 3. _____ tests

Also, we came across four types of tests considering the purposes for which they are used : such as for measuring achievement, for diagnosing learning difficulties, for measuring general ability of learning or intelligence, and for measuring special abilities. These tests, respectively are : a. _____ tests
 b. _____ tests
 c. _____ tests
 d. _____ tests

(Write the missing words in the above sentences)

The correct answer is : 1. oral; 2. written; 3. performance
 a. achievement; b. diagnostic;
 c. intelligence; d. aptitude.

Now, let us try to learn about tools used under other techniques of evaluation.

103. In testing, information for evaluation is based on the product of a task performed by the student.

Thus, it is the product of the performance that is considered and not the _____ itself.

(Write the missing word in the above sentence)

The correct answer is : performance

104. However, in many situations, apart from knowing about the product, we may also have to know how the student arrived at this product.

That is, it may also be important to obtain information about the _____ itself which has resulted in the particular product.

(Write the missing word in the above sentence)

The correct answer is : performance

105. Also, performance in certain aspects such as social behaviour, singing, dramatising, etc. may not result in any product at all.

In such cases also we have to evaluate the student based on the _____ of the task, only.

(Write the missing word in the above sentence)

The correct answer is : performance

106. As we know, information about the performance of a task can be collected by actually _____ the student when he performs. Also, we know that, this procedure of obtaining information for evaluation through observation is called _____ technique.

(Write the missing words in the above sentence)

The correct answer is : observing; observational

In the following frames we shall learn about the tools through which observational technique is applied in the evaluation process. However, we shall, first, note an important point which tells us about the nature of the technique, in general.

107. While using the testing technique, we could generally, assign specific numbers to the answers of the students (i.e. products).

In other words, generally, we can specify the actual amount of learning or changes by _____ing the learning outcomes determined through testing.

(Write the missing word in the above sentence)

The correct answer is : measuring

Let us consider the following situation, of using observational technique and see whether we can measure the information obtained.

108. Suppose the teacher has taught the students to carry out certain experiment in the science laboratory, Now, in order to evaluate, he observes the students when they are doing the experiment.

We may say that the teacher is using the technique of _____ for evaluating the students.

(Write the missing word in the above sentence)

The correct answer is : observation

Through his observation he finds that all could complete the experiment. But, some could do it very well, some could not do well, some did it very badly, and so on. Thus, the quality of performance differed from student to student.

109. Now, for measuring the learning outcome teacher has to assign specific numbers which should indicate the actual amount of learning that has taken place.

Can he assign specific numbers to the learning which he has noted through observation of the performance?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : No

Because, he finds that all the students could do the same experiment completely, even though there was difference in the quality of performance.

110. Thus, we may say that in this case, learning has to be noted in terms of quality and not in terms of quantity.

In other words, in this case, we cannot obtain a quantitative description. We can only obtain a _____ description of learning.

(Write the missing word in the above sentence)

The correct answer is : qualitative

Let us learn how, we may record this qualitative description of the information obtained through observation.

111. We noted that the teacher observed that students differed in the quality of performance. And, he could consider different students as good, average, poor, etc. considering the quality of performance.

Thus, he could classify them into different groups as good, average, poor, etc. based on the _____ of performance.

(Write the missing word in the above sentence)

The correct answer is : quality

112. We may observe that such classification involves actually rating the quality of performance as good, poor, etc.

Thus, through observation we obtain _____ for each student which indicates the _____ of performance.

(Write the missing words in the above sentence)

The correct answer is : rating; quality

113. We can consider the quality as something which increases from very poor to very good or in some similar way. Thus, as it is done on a scale, we can present the ratings on a scale of the following type which represent increase in quality.

Very poor : poor : average : good : very good :

Thus, we may say that we present qualitative description of information through observation through a _____ of _____.

(Write the missing words in the above sentence)

The correct answer is : scale of ratings

114. While actually observing the performance of a task, teacher not only looks to the task as a whole, but in terms of various aspects of carrying out the task. Therefore, before observation, he may list the different aspects involved performing the particular task. And, during the observation he may record his rating for each aspect on a separate scale.

Such an instrument, specifying the different aspect being observed and providing for rating each aspect on a separate scale is called a _____.

(Write the missing words in the above sentence)

The correct answer is : rating scale

The scale that has been presented in Frame 113 contains five classifications or scale points. Any how, teacher may prepare scales with more or less number of scale position depending upon the aspect being measured.

115. In certain rating scales the ratings are specified by numbers as 1, 2, 3, 4, 5 in order indicating the increase in quality. And, the teacher may thus assign these numbers to each aspect of performance. The total of these numbers is some times taken as specifying the quantity of learning i.e. to measure the learning.

Thus, in certain rating scales specific _____ are assigned to the ratings, in order to _____ the characteristic or aspect of learning that is being evaluated.

(Write the missing word in the above sentence)

The correct answer is : numbers; measure

Rating scales are mainly used in the evaluation of different skills and also several aspects of personal-social behaviour.

116. Another, approach to record the observation is to, again, prepare a list of specific actions or behaviours to be observed. And during observation, you may check these behaviours, or actions when they actually take place.

Such a tool is called a _____.

(Write the missing words in the above sentence)

The correct answer is : check list

Check lists may be used for observing the performance of a specific task. Or, it may also be used to record the observations of a student's behaviour during several days.

We may find that certain aspects of behaviour cannot be evaluated observing the student at a particular time. They have to be evaluated through certain incidents or anecdotes as they take place in the usual course of the day.

117. In such cases as explained above, we may record the incident or anecdote when it happens. From these recordings we may finally, evaluate the particular aspect.

Tools of this type where information is provided in terms of records of anecdotes are called _____.

(Write the missing words in the above sentence)

The correct answer is : anecdotal records

118. Suppose, you find that a pupil in the school always remains separate from others and tries to avoid taking part in any group activities. In other words, you find the pupil socially not well adjusted. In order to make him better adjusted you have organised certain programmes through which the student may try to change his behaviour. Suppose you want to evaluate the changes in behaviour of this student through observation.

Can you determine the changes in the pupil's behaviour, particularly regarding his loneliness, by observing just once only?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : No

Obviously, we cannot say anything by observing him just once. Because, changes in such aspects do not take place all of a sudden.

119. As we know, at the school the pupil gets several situations where he may either mix with others or stay alone.

Therefore, in order to determine the change in the pupil's behaviour we may record the several incidents or anecdotes which describe whether the student remained alone or he made any attempt to mix with others.

This record may be considered as an _____.

(Write the missing words in the above sentence)

The correct answer is : anecdotal record

120. We may observe, here, that the anecdotal record gives just description of certain incidents. The teacher has to study the incidents and interpret whether they indicate desirable changes in the behaviour of the students.

Thus, we may say that, in using anecdotal record as a tool of evaluation, the teacher has to first _____ several incidents that he observes over a fairly long period. And, then he has to _____ these incidents to determine the extent to which _____ have taken place in the _____ of the pupil.

(Write the missing words in the above sentences)

The correct answer is : record; interpret; changes;
behaviour

The above illustration of the use of anecdotal records indicates that they are of special value for studying and evaluating certain unusual aspects of emotional and social behaviour.

121. So far, we have, learnt about three tools of evaluation used under observation techniques. These are (i) _____, (ii) _____, (iii) _____.

(Specify the names of the three tools)

The correct answer is : (i) rating scales
(ii) check lists
(iii) anecdotal records

122. In all the three tools, the observer has to carefully see and decide whether a particular aspect of behaviour is there in particular incidents or performances.

Thus, we may say that in using these tools of evaluation, accuracy of results, mainly depend upon the ability of the _____.

(Write the missing word in the above sentence)

The correct answer is : observer

123. Further, many times, during observation the observer may bring in his own opinion, instead of objectively recording the observations.

Thus, generally, we find that these tools under observational technique are less _____.

(Write the missing word in the above sentence)

The correct answer is : objective

Let us, now, try to learn about another technique under this category.

124. From our casual observation we may find that in the classroom or outside certain students always stay together, certain students are more liked by all the students, certain of them are, generally, not liked by any one else, and so on. These social relationships between different students, naturally, influences all aspects of their development.

Thus, we may say that in order to properly understand the students, teacher has to systematically evaluate these _____ among the students.

(Write the missing words in the above sentence)

The correct answer is : social relationships

125. A method for studying these relationships is to create specific situations wherein the students' indicate their preferences or choices or likings through their actions.

We may determine the social relationships among the students through _____ of the students' _____ which indicate their choices, preferences, likings, etc.

(Write the missing words in the above sentence)

The correct answer is : observation; actions

126. For instance, in the play ground we may ask the students 'whom do you want to play with?' or for choosing leaders for different games we may ask 'whom do you want to be your leaders?' And, then we may actually allow them to act according to their choices. Several situations of this type can be presented to the students in the classroom as well as outside.

We may note that each such instance represents a social situation. And, the choices or actions of the students indicate what type of relationships they have with others.

Therefore, by studying the choices i.e. observing their action in these situations we can determine the _____ among the students.

(Write the missing words in the above sentence)

The correct answer is : social relationships

This method of evaluating the social relationships is called 'Sociometric technique'.

127. Thus, sociometric techniques are methods of studying and evaluating social relationships among students.

These methods involve presentation of specific social _____ in which the students' _____ indicate their choices, preferences for particular student, etc. Social relationships among them are determined by _____ these actions or by studying the corresponding choices, preferences, etc.

(Write the missing words in the above sentence)

The correct answer is : situations; actions; observing

These techniques are specially useful in identifying those who are isolated i.e. not preferred by any other student, and helping them to develop proper relationships. It is also useful for identifying those who are liked by many others and who can be good leaders.

128. Thus, we have learnt about four types of observational techniques which are useful for evaluation of specific skills like reading, drawing, etc. and also of social and personal behaviour.

These four types are :

- 1.
- 2.
- 3.
- 4.

(Specify the names of the four types)

The correct answer is : 1. Rating scales
2. Check lists
3. Anecdotal records
4. Sociometric techniques

129. Both under testing and observation we obtain information about the student indirectly from the product of a performance, or the performance, itself. However, we can also obtain certain information directly from the student himself.

As we know, this procedure of obtaining information for evaluation is called _____ technique.

(Write the missing word in the above sentence)

The correct answer is : self-reporting

In the following we shall learn about two specific procedures under this technique of evaluation.

130. In order to make the student report about himself, a way would be to ask him several _____ related to a specific aspect. And, we may obtain information for evaluation from his _____ to these questions.

(Write the missing words in the above sentences)

The correct answer is : questions; answers

131. Thus, we may say that the technique mainly involves questioning and answering.

This we can carry out face to face i.e. we may ask the questions personally. When we adopt this procedure, i.e. when we meet a person and get his answers to the questions, we say that we are having an _____ with the person.

(Write the missing word in the above sentence)

The correct answer is : interview

132. Thus, we may say that 'interview' is a specific procedure under self-reporting technique.

In this procedure the teacher has to meet the student _____ly and obtain _____ directly from the student for questions which are related to the particular aspect being evaluated.

(Write the missing words in the above sentence)

The correct answer is : personally; answers

133. For instance, we may find a teacher asking an individual student about his personal or social problems.

We may say that the teacher is using _____ as the procedure of evaluation.

(Write the missing word in the above sentence)

The correct answer is : interview

134. As we know, in conducting interviews we may use a set of questions specified before hand i.e. we may have structured the interview process. Or, in some cases we do not specify the questions to be asked before hand i.e. it may be unstructured.

Thus, we may say that interviews may be of two types, namely, 1. _____ interviews,
2. _____ interviews.

(Write the missing words in the above sentence)

The correct answer is : 1. structured;
2. unstructured.

135. Instead of asking the questions personally we may also present the questions to be asked in a printed form and obtain answers for them.

These tools consisting of questions in printed form, through which we obtain information for evaluation are called _____naires.

(Write the missing word in the above sentence)

The correct answer is : questionnaires

These tools, namely, questionnaires are also referred to as inventories.

136. Certain questionnaires may consist of all open-end questions, where the student gives his answers in his own words as in an 'interview'.

Such questionnaires are referred to as _____ questionnaires.

(Write the missing words in the above sentence)

The correct answer is : open-end

137. On the other hand, we may also have closed questions where the possible answers are already given, generally as 'Yes' or 'No', 'undecided' etc. and the student only has to indicate his choice.

Such questionnaires are called _____ questionnaires.

(Write the missing word in the above sentence)

The correct answer is : closed

138. Also, in certain questionnaires, instead of questions, only statements will be given. And, the student may be required to express his 'agreement' or 'disagreement' to the ideas presented in each statement. In such a questionnaire, the student is generally made to specify or rate his extent of agreement or disagreement on a rating scale with numbers representing complete disagreement to complete agreement.

As we noted under rating scales, earlier, a total score may be obtained representing the amount of the characteristic being measured.

Thus, we may say that in certain questionnaires, instead of questions, there may be _____. Also, the characteristic being evaluated through the questionnaire may be _____ by obtaining the answers on a _____ scale.

(Write the missing words in the above sentences)

The correct answer is : statements; measured; rating

Questionnaires and interviews are mainly, used in the evaluation of certain personal aspects as interest, attitude, opinion, etc. and also, in understanding personal problems of the students.

Thus, under this section we have learnt about various tools used under different techniques of evaluation.

But, as it was noted earlier, certain tools classified under a particular technique may be used under other techniques also.

139. For instance, we noted that in certain questionnaires which comes under self¹reporting the students may be required to express their agreement or disagreement on a rating scale.

Thus, we find that rating scales are used under _____ technique, also.

(Write the missing word in the above sentence)

The correct answer is : self-reporting

140. Suppose the teacher has asked the students to draw a figure and he evaluates on the basis of their drawings (i.e. product).

That is, he uses the testing technique. But, naturally, he cannot exactly measure the learning in such a case. He, therefore, rates the drawings as good, poor, etc.

Thus, here, rating scale has been used under _____.

(Write the missing word in the above sentence)

The correct answer is : testing

Also, in evaluating certain aspects more than one technique of evaluation may be used.

141. For instance, consider the illustration about preparing cardboard boxes. Teacher may evaluate the final product, which is a cardboard box that has been prepared. Thus, he may use testing. But, he may also evaluate the student's skill in preparing it by observing him when he prepares it.

Thus, here, teacher has employed both _____ and _____ techniques.

(Write the missing words in the above sentence)

The correct answer is : testing; observational

Thus, we may conclude that the teacher has a variety of tools available for use. But, he has to select and use that tools which is appropriate for the particular aspect being evaluated and also suitable for the students for whom it is being administered.

V. Teacher-made Achievement Tests

In the last section we discussed about various tools of evaluation that can be used by the teacher in the schools. And, we noted that achievement tests are the most commonly used tools of evaluation at the school.

Even otherwise, we may easily observe that major part of the school day is always devoted for classroom learning. And, it is natural that more time and effort is spent in evaluating classroom learning. Tests used for the purpose of evaluating learning in different subjects are called achievement tests. We may further specify these tests as teacher-made achievement tests as we are referring to tests prepared by teachers to measure achievement or learning due to classroom instruction.

In the present section, we shall try to learn more details about teacher-made achievement tests. We shall try to know about different types of achievement tests that a teacher may prepare and use. We shall also try to know about the advantages and limitations of these different types of tests. Further, we shall try to note certain points which may act as guidelines in preparing these tests. Thus, we shall try to answer the following specific questions.

--- What are the different types of teacher-made tests of achievement?

--- What are the advantages and limitations of these different types of tests?

--- What guidelines may be followed in preparing these tests?

We know that each type of item has its own value in measuring particular learning outcomes. Therefore, question paper for a comprehensive test may be prepared including all types of items in such a way that it measures achievement in a comprehensive as well as in an accurate way. In other words we shall answer the following question.

--- How to set a good question paper?

In the previous section, we have already learnt certain facts about achievement tests, in general, and teacher-made achievement tests, in particular.

1. Let us, first, try to recall what we have learnt earlier.

We know that the purpose of an achievement test is to determine the extent to which _____ have been achieved.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : educational objectives

2. Further, we noted that teachers prepare tests at schools, always, in relation to classroom instruction.

Thus, teacher-made tests evaluate learning or achievement due to the _____ provided in the classroom.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : instruction

3. We know that a major part of time and energy in the school is devoted to classroom learning.

This fact, further emphasises the need for having _____ tests of achievement.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : teacher-made

-
4. We noted that different types of tests may possess to different extent the characteristics of validity, reliability and objectivity. We also said that certain tests may be less objective by their very nature. Thus, we may classify teacher-made tests into tests which are objective and those which are less objective.

Accordingly, we may call those tests which are objective as _____ type tests; also, those which are not objective as essay type tests.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : objective

5. Objectivity of a test is essentially the objectivity in the procedure of _____ answers written by the students.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : scoring

6. Further, we have also noted that objectivity in scoring is dependent upon the nature of the _____ asked in the test.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : questions

7. As we know, if the questions are such that they do not require specific answers, then the scorers may also differ in their opinion regarding the value of the answers given.

Thus, objective tests contain questions which require
_____ answers.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : specific

8. Under objective type tests we may have such questions which would require the student to give his own answers. But these answers should consist of only one or two
W_____.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : words

This is essential. Because, even if the answer is in one sentence, the scorer while reading the answers may be influenced by his own opinion.

9. We may also adopt a different procedure of obtaining answers. Instead of asking the students to supply the answers we may ourselves give a few possible answers and require the student only to _____ the right one.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : recognise

10. Thus, in objective type tests students have to answer only in one or two _____. However, the student himself has to _____ the answer. Or, we may also have questions which require the student only to _____ the right answer.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : words; supply; recognise

11. An important point we should note is that in an objective type test when we require the students to write their own answers and not select from a given set of alternatives, it is essential that the students are required to write only some specific words.

That is, in objective type tests we may require the students' answers to be in terms of words and not in terms of complete _____.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : sentences

Let us try to see why the answers should not be required in the form of sentences.

12. When the answers are to be in sentences, naturally, different forms of sentences can be written expressing the same idea. But, here, scorers may differ in their opinions as to the particular form of the sentence which expresses the idea in the right way. And, this may, in turn, influence their scoring.

This implies that when students' answers are obtained in the form of sentences, we cannot expect _____ in scoring.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : objectivity

-
13. In other words, when the questions in a test require the students to write their answers in the form of sentences, the test becomes less _____. Therefore, in an objective type test we should not require the students to write answers in the form of _____.

(Write the missing words in the above sentences in the answer sheet)

The correct answer is : objective; sentences

14. But, we may observe that expressing their ideas in the best way is itself an ability that we may expect the student to possess. Thus, though they may not be objective we should also test the students' ability to express their ideas. And, therefore, we should also have questions which require answers in the form of sentences.

As we already know, tests with this type of questions which require answers consisting of one or more sentences are called _____ type tests.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : essay

In the following frames we shall try to learn in detail about 'Essay' type tests.

15. An essay type question does not clearly guide the student as to the particular material that should be written as the answer. For instance, when a question requires the student to discuss the effects of World War II, the student may be knowing many ideas related to World War II. But, here, of all that he knows, he has to select those ideas which he thinks should be included in the answer.

Thus, an essay type test requires the student, first of all, to _____ the particular matter that forms the answer for the particular question.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : select

16. . Selecting the particular ideas that may be included in the answer does not complete the work. Because, before writing those ideas on the paper, they have to be properly organised. He has to decide which idea should appear in the beginning, which later on, etc. in the essay to be written. Then, he may actually write his answer in an essay form.

Thus, in essay type tests, after the student selects the matter which forms the answer, he has to _____ the matter properly, and then _____ his answer in an essay form.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : organise; write

17. We have noted that the student has to select the relevant matter, organise the matter and then write the essay. We may see that each of the above acts, namely, selection and organisation of the relevant ideas, and expressing these ideas in written form represent important learning outcomes. Also, we know that students differ in these abilities. Therefore, through an essay type test we can know the extent to which students possess these abilities (learning outcomes) of selection, organisation and expression of ideas in writing.

Thus, we may say that essay type tests are useful for measuring the outcomes specifying the ability to _____, _____ and to express in _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : select; organise; writing

18. An essay type test as we know contains only few questions and, generally, preparation of essay type test is considered to be _____, when we consider the difficulty involved in preparing objective type tests.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : easy

19. An important characteristic we have to essentially look for in any type of achievement test is whether it can cover all the content areas of instruction.

But, in an essay type test, since it would consist of only few questions, coverage of content will always be _____.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : low or poor

20. Further, accuracy of results obtained by any test depends, mainly, upon whether we can control or guide the student to write only specific answers. Otherwise, student's answers may not clearly indicate actual learning outcomes.

From this point of view, we find that there is practically no control over the nature and actual content of students' answers in essay type tests. In fact, students are _____ to write the answers in their own way.

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23. Another factor involved in the way a student answers may also influence the total score of a student in the same way as guessing does. It is that, sometimes, when a student does not know the actual answer, he may still write some matter which seems to be relevant to the question but does not represent the answer that is actually required. This is, generally, called 'bluffing'. Bluffing may misguide the scorer and make him award marks to the answer given, although it is not correct. This type of error due to bluffing can be avoided if the question is specific and the nature and content of the students' answer is controlled.

Do we control the nature and content of answers in essay type tests?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : No

24. Obviously, we do not bring any control over students' answers in essay type tests. In fact, students are completely free to select and write their answers in the way they want.

Therefore, we may conclude that in essay type tests there is possibility of _____ing by the students which would influence the _____ of answers. And, as a result of this, the students' marks on the test will not represent the _____ of learning in them.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : bluffing; scoring; actual amount

Considering the different aspects of essay type tests, discussed above, we may try to know about their validity, reliability and objectivity which are the essential characteristics of any good instrument of evaluation.

-
25. We noted that essay type questions do not clearly specify the exact answer required. Also, same ideas can be organised and presented in different forms. Because of this lack of specificity in the content and nature of answers required, scoring will be influenced to a great extent by the opinions of the scorers.

Thus, we may say that essay type tests, by their very nature, are not _____.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : objective

26. In addition to this lack of objectivity, we noted that there is possibility of bluffing and also writing ability of the student may interfere in giving the correct answer. Because of these errors in measurement, the total marks obtained by the student may not represent the actual amount of learning in him.

What does the above fact imply about the reliability of essay type tests?

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar in meaning to the following.

It implies that essay type tests have less reliability.

27. Thus, generally, essay type tests are not objective and also less reliable.

What does this tell us about the validity of essay type tests?

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar in meaning to the following.

Validity of essay type tests has to be low as they are less reliable and not objective.

28. Moreover, we noted that essay type tests consist of only a few questions and therefore content coverage will be low.

This also indicates that essay type tests have _____ content validity.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : low

In the above, we found that essay type tests have many drawbacks. They have no objectivity and they are less reliable and less valid.

29. Although essay type questions have so many limitations, it is essential to note that measurement of certain higher level objectives such as application, organisation, interpretation, etc. can be properly done only through essay type tests.

This indicates that in order to measure all types of learning outcomes, particularly, for measuring certain higher level objectives, it is essential to have certain _____ type questions also in the examinations.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : essay

-
30. Thus, essay type questions are essential. But, we also noted that, generally, they are very poor in all the three essential characteristics of a good instrument.

This suggests that we should use essay type tests, but only after making proper _____ment in them.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : improvement

In the following frames we shall try to see how we can improve essay type questions.

31. Consider the following question : 'Describe the three essential characteristics of a good instrument of evaluation and explain why essay type tests are not objective.'

We may see that the first part of the question refers to a particular objective, which is different from the objective referred to in the second part. Here the difficulty may arise as to which should be given more importance. To avoid this situation, it is necessary to set the question in such a way that it does not refer to more than one objective.

In other words, each question in an essay type test should be planned to measure only _____ specific _____ of instruction.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : one; objective

-
32. We know that certain objectives like mere recalling certain names, dates, etc. can be measured through objective tests. Of course, they can be asked in the form of essay questions also, in which case, naturally, the scoring will be less objective.

In such a case, which type of question should be asked : objective type or essay type?

(Write your answer specifying the particular type)

The correct answer is : objective type

33. Thus, we may say that essay type questions should be used only to measure those outcomes which cannot be measured through _____ type questions.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : objective

34. For instance, consider the following two forms of a question on techniques of evaluation.

A. What are the three major techniques of evaluation used in schools?

B. The three major techniques of evaluation used in schools are :

1. _____ technique.

2. _____ technique.

3. _____ technique.

In both the forms, answer expected from the student is to specify the names of the three techniques. But, form A, is an _____ type question while form B. is an _____ type question.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : essay; objective

35. Also, through both A. and B., we are just measuring a knowledge outcome. Student has to recall the names of the three techniques and reproduce them as the answer. Of the two forms, being an objective type questions form B. is specific and it clearly indicates the answer required, viz., names of the three techniques.

Is form A specific and clear about the answer required?

(Write 'Yes' or 'No' in the answer sheet)

You are right if your answer is : No

36. It is not clear and specific. For, it does not clearly indicate whether only the name of the technique should be written or some explanation should be given for each and so on. In the light of the above facts answer the following.

In the above case, which form of question should be used :
Form A. or Form B.?

(Indicate your choice by writing A. or B. in the answer sheet)

The correct answer is : B

37. Form B. should be used because it is completely objective. Form A. is not clear and specific about the exact answer required and therefore, it is not objective.

From the above instance it is further clear that essay questions should not be used to measure those _____ of learning which can be measured through _____ type questions.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : outcomes; objective

38. In the above illustration, we found that both the forms A. and B. measure the same outcome of learning, namely, a knowledge outcome. But, this outcome can be measured more accurately through an _____ type test than through an _____ type test.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : objective; essay

39. In fact, generally, knowledge outcomes which require the student only to recall and recognise or reproduce specific answers can be measured properly by using _____ type tests.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : objective

40. We noted earlier that essay type questions may be used to measure only those outcomes which can not be measured by objective type tests. And, in the above frames, we learnt that knowledge outcomes can be measured properly through objective type tests.

Therefore, we may conclude that essay type tests should not be used for measuring _____ outcomes.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : knowledge

-
41. A very common but, serious defect of essay questions is that they do not indicate in definite and clear terms to the student what he is required to write. For instance, we frequently come across questions of the type, "Write a half page on validity of test".

About validity of tests one can write many things, such as, meaning of validity, types of validity, methods to find out validity of test, relationship between validity and other characteristics and so on.

Does the above essay question indicate to the student the exact answer he should give?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : No

42. When such questions are asked, the pupil naturally has to make guesses concerning what it is that the teacher desires. As a result, the student's answer will not be definite and restricted to the particular aspect being tested.

Therefore, we may say that essay questions should be properly formulated such that they require _____ and _____ answers.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : definite; restricted

When the question does not require definite and restricted answer content of the students' answers will vary so widely that the scorer cannot decide which answer is more appropriate. And, therefore, answers will be scored according to the personal opinion of the scorer and not their actual merit.

Let us consider a question which does not require definite and restricted answer. And, we shall understand how we can improve it to make it more definite and clear.

43. Suppose, you have been asked to answer the following question.

Compare objective and essay type tests.

For this question, one student compares the two type of tests, mainly, with reference to the learning outcomes which can be properly measured through the two types, and with reference to the nature of students' answers in the two types.

But another student, in answer to the same question, compares the two types with reference to preparation of questions in the two types and objectivity of scoring of answers.

Can we decide which of the two answers is more appropriate?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : No

44. In fact, both the answers should be considered as partial answers. Yet, we cannot say anything definitely regarding the appropriateness of the two answers.

Suppose we write the same question in the following form :

'Compare objective and essay type tests with respect to (i) learning outcomes measurable (ii) preparation of questions (iii) coverage of course content (iv) control over pupil's answer (v) scoring.'

We can easily observe that in this case, the question requires _____ and _____ answers from the students.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : definite; restricted

45. So far, we have discussed about two important principles that should be followed in preparing essay type tests, in order to make the test results more reliable.

One of the principle referred to the appropriate purpose for which essay type questions should used. We noted that essay type questions should be used to measure only those learning _____ for which no _____ test is available.

The other principle referred to the proper formulation of essay type questions. We observed that essay questions should be so formulated as to require _____ and _____ answers from the students.

(Write the missing words in the above sentences in the answer sheet)

The correct answer is : outcomes; objective; definite; restricted

46. Further, we have noted that the greatest drawback of essay type tests is that scorers will be influenced by their personal opinions in scoring essay type answers. This may be due to a personal bias toward the styles of writing, the content of the answer itself, or certain other factors such as legibility, spelling, grammatical usage, etc.

Thus, the main limitation of essay type tests is that
 _____ of answers in these tests cannot be _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : scoring; objective

Inspite of this serious limitation it is obvious that we cannot totally stop using essay type tests. The main reason is that it is only through this form that we can test students for the achievement of certain higher level objectives like application, interpretation, evaluation, logical organisation, etc.

Therefore, essay type tests have to be used in the evaluation of classroom learning. But, we may follow certain methods which would increase the objectivity in scoring essay answers.

47. As we know, lack of objectivity of a test refers to the inconsistency in the scoring procedure that may be adopted in scoring the same answer.

But, we may note that this inconsistency in the procedure is not peculiar to evaluation process. In all walks of life we can find activities which are influenced by the personal opinions of those who carry them out. Also, when several people are involved in an activity, we quite often find that there is no consistency or uniformity in the procedure followed by different people in carrying out the same activity. However, when consistency in the procedure is essential, we formulate a standard procedure that may be followed by all.

Similarly, to bring about consistency in scoring answers we may formulate a _____ scoring procedure which can be followed by all the scorers.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : standard

48. While scoring an essay type answer inconsistency comes at the very first stage of deciding as to what matter constitutes the correct answer.

Therefore, the first step in formulating a standard scoring procedure is to formulate a standard _____ to each question.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : answer

This standard answer will guide the scorer as to the content he should look for in the answer.

49. We should bear in mind that the primary purpose of testing is determining actual learning outcomes in the students.

Therefore, both in formulating the standard answer and in checking the answer given by the student, the teacher should check whether it is related to the particular _____ being considered.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : learning outcomes

50. Many times an answer would be scored low because of such external factors as style of writing, spelling, grammatical usage, etc. But, we should observe that here writing is only a medium and these factors do not represent the achievement of learning outcomes.

This suggests that while checking an answer for its content with the standard answer such external factors as legibility, style of writing, errors in spelling, etc. should _____ be considered.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : not

And, even if these factors should be considered then separate scores may be assigned to them, but these should not be taken as part of the scores which represent the actual learning outcomes.

51. Sometimes, different correct answers can be given to the same question with each representing the same learning outcomes.

For instance, you may come across such questions as 'Give atleast two reasons for' or 'Discuss about two important uses of'. It can be easily seen that several choices are there and each will be an acceptable answer.

Thus, when there are certain choices among acceptable answers, then all such acceptable _____ should be included in the _____ answer.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : answers; standard

52. Thus, in order to avoid inconsistency in scoring arising out of differences in the expectations among the scorers as to the content of the correct answer we should formulate

a _____; when several possible choices are there among acceptable answers then all such possible _____ should be included in the _____; further, while checking an answer for its content with the standard answer, we should consider the content only in terms of the particular _____ that are being measured and we should _____ such external factors as legibility, spelling, grammatical usage, etc.

(Write the missing words in the above sentences in the answer sheet)

The correct answer is : standard answer; choices; standard answer; learning outcomes; not consider

53. Another discrepancy in the scoring procedure arises in awarding marks (or credits) to different parts or aspects of an answer. This is a major point to be considered as quite often we find only partial answers to the question.

For instance, consider that students have been asked to describe a phenomenon with atleast four illustrations. For this, you may get a variety of answers. Some students may give only one, or two, or three illustrations. Also, the illustrations may vary in their degree of relevance to the phenomenon. Or, the illustrations may be good but they may not have been properly used in describing the particular phenomenon.

This indicates that there is a need to have a _____ scoring key which divides the total credits or marks for the question into partial credits clearly specifying the _____ that can be allowed to different _____ or aspects of the answer.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : standard; credits or marks; parts

54. Thus, it may be concluded that in order to bring about objectivity in scoring essay type answers we should formulate a _____ for each question which should also include a standard _____ clearly specifying the _____ that can be allowed to differ _____ of the answer.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : standard answer; scoring key; marks; parts

55. Thus, in the above we discussed about certain steps that may be taken to improve essay type tests. However, it is quite clear that essay type tests can not be completely objective even after these improvements.

In fact, as the first principle we stated that essay type tests should be used to measure only those learning outcomes for which _____ are not available.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : objective tests

Thus, teacher should use objective tests wherever he can and use essay tests to the minimum. In the following we shall learn about different types of objective tests.

56. We found that one of the major reasons for the lack of objectivity of essay type tests is that they do not require definite and restricted answers. Unlike this, objective type tests require _____ and _____ answers from the students.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : definite and restricted

57. Also, we have noted that some objective type tests require the students to _____ the answers on their own just as in essay type tests. But, here the answers consist of one or two _____ only.

(Write the missing words in the above sentences in the answer sheet)

The correct answer is : supply or write; words

58. Since in this type students have to supply their answers, tests of this type are called _____ type tests.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : supply

59. In the other type of objective tests students are not required to supply the answers. Instead, they have to only _____ the correct answer from a given set of alternatives.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : select

60. This type of objective tests where the students have to only select the correct answer are referred to as _____ ion type tests.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : selection

61. Thus, objective tests can be broadly classified into two types. These two types are

1. _____ type tests

2. _____ type tests

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : 1. supply; 2. selection

Let us first discuss about the supply type tests

62. Under this type we may ask direct questions as in essay type tests. But, these questions would require only short answers consisting of only one or two specific words.

This type of questions may be referred to as _____
_____ type tests.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : short answer

63. Another method adopted under the supply type is that students are presented with a statement in which one or two words would be missing. And, they are to complete the statement by supplying the missing word or words.

Tests consisting of this type of items are known as _____
_____ tion tests.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : completion

We noted that under short answer and completion type items students have to supply the answers.

Let us consider certain examples and understand the nature of these two types.

64. We noted that short answer items consist of a direct question requiring a short answer from the students. Consider the following questions :

- (a) What is the name of the prime minister of India?
- (b) What is the chemical formula for hydrochloric acid?
- (c) In which year did India become independent?

We may observe that all these are direct questions and require answers of one or two words, symbols or numbers.

Thus, we may say that short answer items require answers in the form of one or two _____, _____, or _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : words; symbols; or numbers

65. As we can observe, in all the examples the student's answers will be some information which he has already memorised and he only has to recall that information.

Thus, we may say that short answer questions are suitable for testing the ability to _____ memorised information.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : recall

66. Let us consider certain other illustrations.

- (i) In a triangle ABC, if $\angle A = 30^\circ$ and $\angle B = 60^\circ$, what will $\angle C$ be equal to?

- (ii) Suppose the price of a book is 12 Rs. what will be the price of 10 copies of the book?

We may observe that here student's answers do not represent information that has to be merely recalled. Instead, in order to arrive at the answer, the student has to solve certain simple mathematical problems.

Thus, we find that short answer tests are also useful for measuring simple _____ ing abilities.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : problem solving

67. We may say that short answer tests are suitable for measuring outcomes related to _____ of memorised information and also, outcomes related to certain simple _____ abilities in mathematics.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : recall; problem solving

68. Consider the following items which come under the completion test.

- A. The name of the prime minister of india is _____.
- B. The chemical formula for hydrochloric acid is _____.
- C. In a triangle ABC, if $\angle A = 30^\circ$ and $\angle B = 60^\circ$, then $\angle C =$ _____.
- D. If the price of a book is 12 Rs. then the price of 10 copies of the book will be _____ Rs.

We may observe that completion of statements A and B require the student only to _____ some information which he already knows.

But, completing statements C and D require some _____ ing on the part of the student.

(Write the missing words in the above sentences in the answer sheet)

The correct answer is : recall; problem solving

69. We had earlier specified short-answer and completion tests as two types under the supply type tests.

Let us study the examples given for the two types in the above frames (Frames 54, 56 and 58) and see how the two types differ.

It can be easily seen that same questions have come under both the types but have been presented in different forms.

Thus, we may say that short answer and completion tests are essentially the _____, differing only in the _____ of presenting the questions i.e. either in the form of direct _____ or in the form of incomplete _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : same; form; questions; statements

70. An important advantage of these tests is that the student must either recall the information required or make the necessary calculations to solve the problem.

Thus, in these tests student can not get at the correct answer by _____ing, which may be possible when alternative answers are presented and he knows that one of the alternatives must be correct.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : guessing

71. Since in these tests the students have to write the answers, sometimes the answers may be wrongly spelt.

Suppose you have given the following question.

What is the name of the prime minister of India? or The name of the prime minister of India is _____.

You expect the students to write 'Indira Gandhi'. But, you find that some students have written 'Indra Gandhi' or 'Indra Gandi!!'.

That is, you find that some students have spelt the words wrongly. This may lead to inconsistency in scoring. Some may ignore the error in spelling while some teachers may think that wrong spelling indicates that the student does not know the required answer.

Thus, sometimes scoring on the short answer test will not be _____.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : objective

72. Consider the following.

Who is the prime minister of India? or The prime minister of India is _____. The teacher may expect to get the names of the prime minister. But, he may find a variety of answers, such as 'a woman', 'a lady', etc.

Suppose the same is written as follows.

What is the name of the prime minister of India? Obviously, teacher would not find such differences in the students' answers because the question requires a specific answer.

This suggests that the question or the blank in the incomplete statement should require a _____ answer.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : specific

73. We noted that direct question form and incomplete statement form are essentially the same differing only in the method of presentation. However, study the following forms of a question.

A. _____ is the capital of Gujarat State.

B. What is the capital of Gujarat State?

Suppose this question has to be presented to children, particularly at the lower classes.

Which form, A. or B., do you think the children will understand more easily?

(Write A. or B. in the answer sheet)

The correct answer is : B.

74. This can be easily seen, because first of all students are quite familiar with direct questions. In the other form they have to first understand the structure of the sentence and then the position of the blank. Only in certain situations, an incomplete statement may make it more concise.

Thus, _____ form is, generally, more desirable than _____ form except where the second form makes the idea more concise.

(Write the missing words in the above sentence)

The correct answer is : direct question; incomplete statement

75. Sometimes teachers may take a statement directly from the textbook and remove a word to make it incomplete. But, such questions may not require definite and restricted answers. Suppose the teacher wants the answer 'Halogen'. For this, he may write the textbook sentence as below :

'Chlorine is a _____.'

But, he finds that many students give 'gas' as the answer.

He then changes the question as follows :

'Chlorine belongs to a group of elements that combine with metals to form salt. It is therefore called a _____.'

We can easily see that in this form there are no chances of getting such answers as 'gas'.

This suggests that we should not take statements directly from _____ to use as a basis of short answer items.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : textbooks

76. Thus, we have noted three important guidelines to be followed in constructing supply type items i.e. short answer or completion type. These are :

- (1) The question or the blank in the statement should require a _____ answer from the student.
- (2) In the lower classes, _____ form is more desirable than _____ form except where it makes the idea more concise.
- (3) Statements should not be taken directly from _____ to be used as a basis for short answer items.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : specific
direct question; incomplete statement
textbooks

Let us, now, try to know, in detail, about the selection type tests.

77. We have already learnt that in selection type tests, students do not have to _____ their answers. They only have to _____ the correct answer from a given set of alternatives.

(Write the missing words in the above sentences in the answer sheet)

The correct answer is : write; select

We may note that a given set of alternatives may contain two to any number of choices. Let us consider the case where there are only two choices.

78. Objective type questions with only two alternatives are obtained by giving statements which the student is required to mark true or false, right or wrong, yes or no, and the like.

We may observe that there are only _____ possible answers. Since the true-false alternative is the most common form, a test with items of this type is, generally, referred to as _____ type test.

(Write the missing words in the above sentences in the answer sheet)

The correct answer is : two; true-false

79. Let us study the following examples and find out what learning outcomes are determined through these tests.

- | | | |
|---|---|---|
| T | F | 1. Wax is soluble in water. |
| T | F | 2. Photosynthesis is the process by which leaves make the food for a plant. |
| T | F | 3. The earth revolves around the sun. |
| T | F | 4. 25% of 44 is less than 12. |
| T | F | 5. Particles of negative electricity are called neutrons. |

In the above set of examples, we may observe that items 1, 3, & 4 are statements of facts, which may be correct or incorrect, and, items 2 and 5 are definitions of terms

'photosynthesis' and 'neutrons', respectively, which may be correct or incorrect. The student is required to identify these as : correct or incorrect.

Thus, we may say that true-false test items consist of specific _____. These may be statements of _____, _____ of terms, and the like. The student is required to identify the _____ness of these statements.

(Write the missing words in the above sentences in the answer sheet)

The correct answer is : statements; facts; definitions;
correctness

80. From the above frame, it is clear that True-False tests are useful for measuring the ability to _____ the correctness of statements of _____, _____ of terms, statements of principles and the like.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : identify; facts; definitions

The above indicates that True-False items are suitable for measuring certain simple learning outcomes which, mainly, involve recall of learnt material.

81. An important point about these items should be noted.

Consider the following item :

T F Particles of negative electricity are called neutrons.

A student may identify that negative electricity particles are not called neutrons. So, he marks the statement as (F).

And, this indicates that the student knows that this definition of neutrons is incorrect.

But, does this mean that the student knows the correct definition of neutrons?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : No

Therefore, we may say that this is a crude measure of knowledge of the students.

82. An advantage of these items is that scoring of these items is quite easy and it is also _____ ve.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : objective

83. Although, scoring of these tests is objective, reliability of these tests is very low. Suppose a student has got 25 items correct on a test of 50 items.

Can we check whether he has really identified the correctness or he has merely guessed?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : No

Obviously, we cannot know whether the students' score is due to guessing or it represents actual learning.

Preparation of True-False items is considered to be, generally, very easy. However, in practice, preparing items which really measure learning is a difficult job.

In the following we shall discuss about certain things which should be avoided in these items.

84. Consider the following statement.

'Observational techniques are not objective'.

We may note that the above statement refers to a broad generalisation about the objectivity of observational techniques. This implies that no observational technique is objective.

Can we agree that no observational technique is objective?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : No

85. Suppose, we avoid the broad generalisation and write the item as 'Observational techniques are, generally, not objective'. This is certainly acceptable.

Thus, we may say that while constructing True-False items we should avoid _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : broad generalizations

86. In order to avoid broad generalization, sometimes, very trivial statements are given. For instance,

T F 'During the world war II, United States declared war on Japan on December 7, 1941.'

It is naturally, not necessary for the student to know the exact date of such events.

Thus we may say that in writing True-False items we have to avoid _____ statements.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : trivial

87. Consider the following item.

T F	'Despite the difficulties of determining the exact pH value of a solution, it is possible to determine if a solution is acid by the red colour formed on litmus paper when it is converted into solution.'
--------	--

Such long sentences would, invariably come in the way of some students' answering as they may not clearly understand the statement.

Thus we may say that we should avoid _____ sentences.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : long

Thus, we have noted that although preparation of True-False items looks to be easy, it is not so in practice. And, certain guidelines, as those noted above, should be kept in view while preparing the items.

Now, let us go to the next type under the selection tests.

88. In another type of selection type item, instead of one statement several statements, phrases or words will be given. And, instead of two alternatives a set of several alternatives will be placed in a column in front of the first list. Thus, all the items, will have several alternatives.

Student in this case is required to match the words or phrases in the two sets. And, this type of tests are called _____ing tests.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : matching

89. Let us study the following example.

<u>Column A</u>	<u>Column B</u>
1. Names of the answer in addition problems.	A. Difference B. Multiplication
2. Name of the answer in situation problems.	C. Divident D. Product
3. Name of the answer in Multiplication problems.	E. Quotient F. Subtrahand
4. Name of the answer in division problems.	G. Sum

We may observe that in these items the student has to actually identify the relationship between the two things.

Thus, we may say that matching tests are useful for measuring student's ability to _____ the _____ between two things.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : identify; relationship

However, the typical matching exercise, as the one given above, is suitable only for measuring factual information based on simple associations.

90. Consider the following example.

A	B
1. Square	(a) Figure in which all the sides are equal.
2. diameter	
3. isosceles triangle	(b) Figure in which two angles are equal.
4. perimeter	
5. rectangle	(c) Figure in which the diagonals bisect each other but not at right angles.
6. radius	

In this example, we can observe that under A, items 1, 3, 5 represent names of figures while other three items are names of mere lengths. Thus, we find that there is no uniformity in the set. And, in fact, under B, all the three are properties of figures. Therefore, for a student who differentiates lengths and figures there is no multiple choice. Moreover, items under B are also not uniform. A student, with such matching exercises, will only be confused.

Thus, we may say that in matching tests there should be _____ of property among the things or items coming under any of the two columns or lists.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : uniformity

Let us now try to learn about another type of selection type tests.

91. We noted in the very beginning that supply type items require the student to _____ his answers. And, selection type tests require him only to _____ the correct answer.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : write; recognise

92. Accordingly, we may have a selection type test which consists of a direct _____ or an _____ statement. This will be followed by multiple number of choices from which the student has to _____ the correct one. This type of tests are called _____ tests.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : question; incomplete; select; multiple choice

93. Completion tests are found to be, somewhat, subjective, which is caused by the freedom given to the student to write his own answer.

In multiple choice item student is not given any _____ to write his answer. Instead, the _____ one, which he thinks to be correct, from a set of more than two choices. Since there is complete control over the student's response, we find that the multiple choice tests are _____.

(Write the missing words in the above sentences in the answer sheet)

The correct answer is : freedom; selects; objective

94. We noted that true-false items consist of two choices as answers to the question given. And, we noted that because of this there is great possibility for guessing. But, in multiple choice tests since there are several choices which the student can choose, the possibility of _____ is much reduced. Thus, multiple choice tests are more reliable.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : guessing

95. Therefore, from the point of view of objectivity and reliability, multiple choice tests are definitely _____ then the completion and true-false tests.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : better

96. In multiple choice tests student has to choose from a set of multiple number of choices while in true-false tests only two possible choices are given.

Thus, in a way we may consider true-false tests as simplified type of _____ test.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : multiple choice

97. However, in true-false type only one alternative response is given to the correct response in each case. That is why, sometimes, true-false tests are also referred to as _____ tests.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : alterhate response

98. In matching tests, we may consider one list of words, or phrases, or symbols, etc. to form a set of multiple choices for each item in the other list. For instance, consider the following.

- | (a) | (b) |
|------------------|---|
| 1. Square | A. Diagonals bisect but are not at right angles. |
| 2. Rhombus | B. Diagonals are at right angles but only one is bisected by the other. |
| 3. Parallelogram | C. Diagonals bisect, are at right angles but unequal. |
| | D. Diagonals bisect and one at right angles. |

In this, for each of 1, 2, and 3 in (a) we can take A, B, C, and D under (b) to be four alternatives or multiple choices.

Thus, a matching test can be taken as a special form of a _____ test, which may be considered as a combination of several multiple choice items.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : multiple choice

Now, let us take up certain examples and see the nature of items in a multiple choice test.

99. We said that a multiple choice item consists of a direct question or an incomplete statement. This is called the stem of the item. It is followed by a list of suggested answers which are called alternatives.

Specify the stem of the following item

The capital of Gujarat is

- (a) Baroda
- (b) Surat
- (c) Ahmedabad
- (d) Rajkot

(Write your answer in the answer sheet)

The correct answer is : The capital of Gujarat is

100. We have noted that the stem is followed by a set of possible alternatives. Of these, one is the answer to the question while the remaining are placed merely to distract the attention of a student who does not know the answer.

These alternatives other than the answer called _____ers.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : distractors

101. Consider the following example

The capital of Gujarat is

- (a) Baroda
- (b) Surat
- (c) Ahmedabad
- (d) Rajkot

Here, there is only one correct answer and the student has to identify it. This type is called _____ type. But, in certain other questions there may not be only one correct answer, the student has to choose the best answer from the alternative given. This type is called _____ type.

(Write the missing words in the above sentences in the answer sheet)

The correct answer is : correct answer; best answer

Unlike the other objective type tests multiple choice tests are also useful for measuring certain higher level learning outcomes, viz., application, interpretation, etc.

102. Consider the following example

- India is (i) ruled by the Britishers.
 (ii) situated in the African continent.
 (iii) a peninsula.
 (iv) in the western hemisphere.

Here, we may see that the stem does not represent a meaningful problem. The distracters refer to four widely separated ideas. This therefore does not present a clear problem to the student.

Thus, we may say that in a multiple choice item the _____ should always represents a _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : stem; meaningful problem

103. Further, in the above example, since the alternatives are not homogeneous in meaning, they may not really distract the students attention at all. A student who has partial knowledge may also be able to exclude those which do not seem related to the idea and arrive at the correct answer.

Thus, we may say that distracters should be _____.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : homogeneous

Apart from these, several of the suggestions given for other objective type tests also should be borne in mind while preparing multiple choice items.

104. Thus, under selection type tests we have come across three specific types of tests. They are,

1. _____ tests
2. _____ tests
3. _____ tests

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : 1. True-False

2. Matching

3. Multiple choice

105. However, we noted that, inspite of their advantage regarding ease of scoring, objectivity and such other aspects, objective tests can measure only simple learning outcomes, mainly, at the knowledge level.

Therefore, we may say that in a good test which proposes to measure all levels of objectives we should have _____ types of tests and also _____ type questions.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : objective; essay

In preparing a good question paper teacher should consider certain important principles. We shall discuss some of them in the following.

106. As we know, the most important characteristic of an achievement test is content validity, that is, the test represents all content areas.

For this, the teacher may first of all divide the course into several units and decide about the weightage to be given to different content units.

Thus, the first step in preparing a good question paper is to analyse the course content into different _____ and decide about the _____ to be given to each one of them in the test.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : content units; weightage

107. Also, we know that instruction in different content units correspond to specific educational objectives. And, these specific objectives will be at all levels, knowledge, understanding, application, etc.

Therefore, after analysing the course into content units the teacher has to specify the weightage to be given for different objectives of each level under each content unit.

Thus, apart from analysing into content units, the teacher should also _____ the weightage to be given to objectives of different _____ like, knowledge, understanding, etc. under each content unit.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : specify; levels

108. Thus, we may say that the teacher has to make specifications of two types.

First, he has to specify the different _____ units of the course and the weightage to each of them. Then, he has to specify the objectives of different _____ and _____ to be given to them under each content units.

(Write the missing words in the above sentences in the answer sheet)

The correct answer is : content; levels; weightage

109. On the basis of the specifications made regarding the content units and the objectives of different levels, the teacher may actually prepare a table of the type given in the next frame. Such a table representing the specifications of content units and objectives is generally known as a "table of _____".

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : specifications

110. Let us study the following table of specifications for a social studies test.

Content Area	Objectives				Total
	Know-ledge	Underst-anding	Appli-cation	Interpre-tation	
Food	12	3	-	-	15
Clothing	16	4	5	-	25
Transpor-tation	8	5	2	5	20
Communi-cation	8	5	2	5	20
Housing	10	5	5	-	20
TOTAL	<u>54</u>	<u>22</u>	<u>14</u>	<u>10</u>	<u>100</u>

The numbers like 12, 3, 26, 4, 5, etc. in the different cells are in percentages. For instance 12 in the first cell indicates that 12 percent of the items in the test, related to the content area 'Food' will be concerned with knowledge. Similarly, 3 percent of this content unit will be concerned with objectives of understanding level.

Thus, such a table of specifications clearly indicates to the teacher, how much weightage should be given for objectives of different _____ under each _____ unit.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : levels; content

111. While discussing about different types of objective tests and also essay tests we noted that different types of test items would be suitable for evaluating different learning outcomes or objectives.

From the table, we can easily make out what type of questions would be framed under the different _____ units so that they are appropriate for evaluating the corresponding _____ at the specified level.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : content; objectives

112. The table can also help the teacher in specifying the number of questions to be asked under the different content units, so that the test will possess _____ ity.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : content validity

113. This type of table actually serves the teacher the same purpose as a blue print of the design of a building to be constructed would do for an engineer.

That is why, a ~~table~~ of specifications is also referred to as a _____ for the test.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : blue print

114. Thus, with the help of a blue print teacher will be able to see that the question paper covers all _____ units and also objectives of all _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : content; levels

115. From the above, we may note two principles that should be borne in mind while setting a question paper for a comprehensive test.

They are :

- (i) the question paper should cover all _____ units.
- (ii) the question paper should cover objectives of all _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : content; levels

-
116. Another aspect that should be taken care of in a question paper is regarding the difficulty level of questions.

We know that in any class there will be students with different degrees of achievement. Suppose we set a question paper in which all questions are of same difficulty level, i.e. all are easy questions or all are difficult questions.

Can this paper properly measure students with different degrees of achievement?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : No

117. Obviously, it cannot properly measure students with different degrees of achievement. Therefore, in order to measure achievement of all the students in a class, a question paper should consist of questions of _____ difficulty levels.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : different

Generally, in a comprehensive examination question paper, about 25% of the questions should be of high difficulty level and 25% of low difficulty level, the remaining being at the average difficulty level.

118. Thus, we have noted a third guideline to be followed while setting a question paper. It is :

(iii) a question paper should consist of questions of _____ difficulty levels.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : different

119. Another point, which can be directly inferred by referring to the blue print, relates to the types of question to be included in a question paper.

We have learnt that different types of questions are suitable for measuring different learning outcomes. Therefore, it is clear that the question paper should include different types of _____ ve tests, and _____ type questions also.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : objective; essay

120. Thus, the fourth point to be remembered while setting a question paper is :

(iv) it should contain different types of _____ tests, and _____ type questions.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : objective; essay

121. The fifth principle to be followed refers to choices in a test and its relation to content validity.

We know that content validity is the most important characteristic of an achievement test.

We say that an achievement test has content validity if it measures learning related to all _____ units which are supposed to be included in the test.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : content

122. Suppose you have set a question paper for a course in Physics with content units relating to Sound, Light, Heat, etc. And, you set a question paper in which there are broad choices such that a student may answer questions on either Sound or Light, i.e. he does not have to answer questions on all the content areas.

Will this test measure learning relating to all the content units of the course?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : No

123. Obviously, it cannot, as there are broad choices between different content areas of the course.

We may say that such a question paper which does not measure learning related to all content areas will not have _____ validity.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : content

124. Thus, in a question paper choices between different content areas affect the content validity of the question paper. Since, content validity is the most important characteristic of an achievement test we may say that a question paper should not have _____ between different content areas as they affect the _____ of the question paper.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : choices; content validity

125. The fifth principle, therefore, to be borne in mind while setting a question paper is that,

- (v) there should not be _____ between questions on different _____ areas.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : choices; content

126. Another important aspect which we noted under the reliability of a test is regarding the clarity of language of the questions.

We noted that if the language used in the questions is not clear and easily understandable to all the students their answers may not represent actual learning in them.

Thus, we may state as the sixth principle that there should be _____ of language used in the questions.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : clarity

127. Apart from the above points which are directly related to the questions we should also take care that the students are given specific directions.

Therefore, the seventh principle in setting a question paper refers to the specificity of directions to students. That is :

- (vii) the question paper should contain _____
 _____ to students as to what they should do
 under each question.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : specific directions

128. Thus, we have noted that while setting a question paper or a comprehensive test we should follow seven basic guidelines. They are :

- (i) the question paper should cover all _____ units;
- (ii) the question paper should have questions to measure objectives of _____ levels;
- (iii) in the question paper there should be questions of _____ difficulty levels;
- (iv) the question paper should contain different types of _____ type questions as well as _____ type questions;
- (v) in the question paper there should not be _____ between questions on different _____ areas;
- (vi) there should be _____ of language used in the questions;
- (vii) it should include _____ directions to students as to what they should do under each question.

(Write the missing words in the above sentences in the answer sheet)

The correct answer is : content; all; different; objective;
 essay; choices; content; clarity;
 specific.

Thus, the seven guidelines to be followed in setting a question paper refers to seven different aspects, namely, (i) content coverage, (ii) coverage of objectives of all levels, (iii) difficulty level of questions, (iv) types of tests to be included, (v) effect of broad choices on content validity, (vi) clarity of language, and (vii) specificity of directions to students.

Thus, it may be concluded that the teacher has a variety of test item types which he can use for evaluating the achievement of the students. And, it is left to the teacher to adopt proper test items in proper proportion in the question paper he would use to evaluate the students' achievement in different school subjects.

VI. Elementary Statistical Concepts

During our discussions in the previous sections we learnt about various tests, ways to prepare them and use them. We also learnt as to how various aspects of development of the students such as achievement in school subjects, intelligence, aptitude etc. are measured with the help of various tests. We noted that measurement involves assigning numbers. Thus, through measurement we obtain sets of scores for the students. And, these scores get meaning when they are compared with numbers which represent the achievement of specific educational objectives.

Thus, the teacher interprets the numbers obtained through testing by comparing them with numbers representing the expected amount of learning specified in educational objectives. This comparison tells the teacher regarding the student's position as an individual.

But, as we know, teacher has to teach the student as a member of a group of students namely, class. And, therefore, he has to understand each student's position in relation to the group as a whole.

For this, the teacher generally compares the individual student's performance with the performance of the class as a whole on different tests. But, this requires the teacher to obtain some numbers to represent the nature of the group's performance.

In this section we shall try to learn the methods by which we may understand the nature of performance of groups so that the individual's position can be interpreted meaningfully.

About the performance of a class as a whole we can try to know what is the average performance. Or we may also try to know what is the general nature of the students in the class in terms of how much they vary from each other. And, also, we may understand whether we can have a way of comparing scores obtained in different subjects.

Thus, we shall try to answer the questions

- How to obtain numbers or indices representing the average nature of a class?
- How to obtain numbers or indices representing the variability among the members of a class?
- How to obtain scores with which we can compare a student's position in different subjects?

We noted that mere scores by themselves do not carry any meaning. A way of presenting the numbers so that they would carry meaning is to represent them in a graphical manner. Accordingly, we shall also answer the question.

- How to represent scores obtained on a test graphically?
-

The main purpose of this section is to learn certain techniques to analyse and understand the nature of achievement and abilities of a particular group and to know clearly the position of different individuals in relation to the group they belong to.

1. We have learnt that in order to know the achievement and abilities of a student we measure his achievement and abilities by administering several tools of evaluation.

Through this measurement we obtain specific _____ which represent his achievement and abilities.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : numbers or scores

2. Since the scores obtained by the students represent their abilities and achievement, we may say that in order to understand a group or an individual in relation to the group, we should study the set of _____ obtained by the particular group.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : scores

3. Let us, therefore, consider the scores of a small group of five students on an achievement test. Suppose the scores of these five students are 24, 25, 26, 25, 25.

In the set of scores given we can easily see that 26 is the _____ score and _____ is the lowest score for the group.

(Write the missing word or number in the above sentence in the answer sheet)

The correct answer is : highest; 24

4. We can also easily conclude from the set of scores that average achievement of the group is represented by the score _____.

(Write the missing number in the above sentence in the answer sheet)

The correct answer is : 25

5. Since the highest score and the lowest score differ by only 2 we may also conclude that the students in the group do not _____ much in their achievement.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : differ or vary

Thus, from the scores we could directly conclude about the average achievement of the group and also as to how much the members of the group vary in their achievement, i.e. about the variability of the group. But, as we know, a class may not consist of only 5 students; the teacher will have to consider larger groups of students.

6. Let us consider the achievement scores of a class of 33 students as presented below in Table 1.

Table 1 : Scores of 33 students on an achievement test

15	13	14	13	15	17	16
22	20	24	24	20	24	21
8	22	14	8	23	12	15
23	18	24	15	6	25	
9	25	23	25	7	14	

We said that the scores of a group taken together indicate the general nature of performance of the group as a whole.

But, can we know anything directly from the above set of scores regarding the general performance of the group?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : 'No'

Obviously, we cannot know anything from the above table as the scores are large in number and they have not been arranged in any specific order.

7. We may observe that the scores have been presented in the above table just as they have been obtained after scoring the test answer papers. We may say that these scores are like the raw materials that we come across in daily life which have to be processed before they can be used for different purposes. Here, also, the teacher cannot use these scores directly for the purpose of understanding the nature of the performance of the group.

Therefore, we may consider these scores which are just as they have been obtained after scoring the test answers as _____ scores.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : raw

Let us see what a teacher can do with these scores so that he can know about the individuals in the group and the group as a whole.

8. We said that we cannot know anything directly from the above set of scores because they are not in any specific order.

As we know, the simplest way to arrange a set of numbers (i.e. scores) is to arrange them in the _____ or decreasing order.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : increasing

9. Accordingly, we may arrange the 33 scores in Table 1 in the increasing order as in Table 2 below.

Table 2 : Scores on an achievement test arranged in the increasing order.

6	12	15	17	21	23	25
7	13	15	18	22	24	25
8	13	15	19	22	24	25
8	14	15	20	23	24	
9	14	16	20	23	24	

In the above table, scores have been arranged in increasing order, with 6 as the first score and 25 as the last score.

Thus, 6 is the _____ score and 25 is the _____ score for the group as a whole.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : lowest; highest

10. As we know, after the scores of all the students have been noted, teachers announce the ranks of the students as first, second, third, etc. The student who has scored highest is considered to be the first, the student with next highest score as the second and so on.

Can we directly find out the ranks of the students from Table 2?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : Yes

11. Thus, by rearranging the raw scores in the increasing or decreasing order the teacher can directly know about the ranks of the students.

In the set of scores presented in Table 2, 25 and 24 represent the scores of _____ and _____ rank students, respectively.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : first; second

12. When we talk of prices of different material, in our daily life, we quite often say that the price of particular material ranges from say 12 Rs. to 18 Rs., and so on. Here, the material with price 12 Rs. is considered as the material with the lowest price and that with 18 Rs. as the one with highest price.

Also, in the set of scores presented in Table 2, we come across lowest and highest scores, viz., 6 and 25 respectively. Therefore, we may say that the scores of the corresponding group of students _____ from 6 to 25.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : range

-
13. The difference between the highest and the lowest score is called the range of scores.

Therefore, for the set of scores presented in Table 2

$$\text{Range} = 25 - 6 = \underline{\hspace{2cm}}.$$

(Write the missing number in the above in the answer sheet)

The correct answer is : 19

14. Suppose a teacher has administered a test to some seven students and the scores are 18, 23, 14, 38, 21, 20, 19. Here,

The lowest score =

the highest score =

and, the range = highest score - lowest score

$$= \underline{\hspace{2cm}} - \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

(Write the missing numbers in the above)

The correct answer is : 14; 28; 28 - 14 = 14

15. Thus, we noted that from raw scores the teacher can _____ the students as first, second, etc., and also, calculate the _____ of scores, which is the difference between the _____ score and the _____ score.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : rank; range; highest; lowest

16. The range of scores tells the teacher as to how much the two students, viz., the first rank student and the last rank student, vary in their achievement.

Thus, the teacher identifies the student with lowest score as very poor and offers him help. Similarly, he comes to know about the best student and his ability. But, the teacher is required to consider all the students, and not merely the first and the last students, so that he can properly adjust his teaching to the whole class.

But, from the raw scores and the range, can the teacher decide anything definite about all the students?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : No

17. Obviously, he cannot decide anything directly. We may observe that if the teacher considers the student with a score of 6 as very poor and needing help, perhaps, he should consider those with score 7 also in the same category. Similarly, he should consider the students with scores 23 and 24 to be equally good as the one with score 25.

Still, can he consider all others, i.e. all those with scores ranging from 8 to 22, in a single group?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : No

18. In fact, he will have to consider some students, say, those with scores 8, 9 and 10 also to be poor and needing help but, better than those with score 7 and below. Similarly, he may consider these with scores 20, 21 and 22 to be good but not so good as those with score 23 and above. In the same way he may consider students with scores from 11 to 19

as belonging to different groups as those with scores from 11 to 13, those with 14 to 16 and those with 17 to 19.

Thus, we may say that the teacher has to understand the achievement levels of not merely those at the extremes but of all the students in the class. For this purpose, he may _____ the students on the basis of their scores, as those with scores 8, 9 and 10; those with 11, 12 and 13, and so on.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : group

19. When the raw scores of students of a whole class are given, in order to understand the nature of performance of all the students, we may form several groups of raw scores, each group representing scores of particular range like 8 to 10, 11 to 13, etc. Scores of an achievement test presented in Table 2 may be grouped and presented as in Table 3 below.

Table 3 : Grouped scores

5 - 7	Thus, when the teacher has to
8 - 10	find out students of different
11 - 13	achievement levels, in a way,
14 - 16	he may consider all students
17 - 19	in particular groups like 5 - 7,
20 - 22	8 - 10, etc. as of approxima-
23 - 25	tely same _____ level.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : achievement

20. In Table 3, each group such as 5 - 7, 8 - 10, etc. may be considered to represent the scores of a small class of students which lie in intervals of scores, viz., 5 to 7, 8 to 10, etc.

Therefore, the different groups of scores such as 5 - 7, 8 - 10, 11 - 13, etc., as presented in Table 3, may be called _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : class interval (C.I.)

When the teacher finds out students belonging to different class intervals, it tells him about their achievement levels.

21. Suppose the teacher finds that scores of most of the students are in the class intervals 22 - 24 and 23 - 25.

What does this suggest about the general performance of the whole group of students?

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar in meaning to the following:

It shows that achievement of the class as a whole is good.

22. On the other hand, suppose the teacher finds that scores of a large number of students are in the class intervals 5 - 7 and 8 - 10.

Does this also suggest anything to the teacher about the general achievement of the class as a whole?

(Write 'Yes' or 'No' in the answer sheet)

The correct answer is : Yes

23. Thus, we may say that we can know about the general nature of the class as a whole by finding out the number of students whose scores lie in different _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : class intervals

24. Let us consider the raw scores given in Table 1 and find out how many of them lie in different class intervals presented in Table 3. This can be written as follows.

Table 4 : Grouping of raw scores into different class intervals.

Class Interval (C.I.)	No. of Students (f)
23 - 25	10
20 - 22	5
17 - 19	3
14 - 16	7
11 - 13	3
8 - 10	3
5 - 7	2

What do the numbers 10, 5, 3, 7, etc. in the second column of the above table represent?

(Write your answer in one sentence in the answer sheet)

You are right if your answer is similar in meaning to the following:

10, 5, 3, 7, etc. represent the total number of students with scores lying in the class intervals 23 - 25, 20 - 22, 17 - 19, etc. respectively.

-
25. In other words, the numbers in the second column of Table 4 tells us how frequently are scores appearing in the corresponding class intervals.

Accordingly, the number indicating how frequently scores are appearing in a particular class interval is called the _____cy of the class interval.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : frequency

26. Thus, in Table 4, the numbers 10, 5, 3, 7, etc. in the second column indicate the _____ of the class intervals, 23 - 25, 20 - 22, 17 - 19, 14 - 16, etc. respectively.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : frequencies

27. The term 'frequency' is generally denoted by the symbol 'f'. You may observe that in Table 4, the second column which indicates the _____ of the different class intervals is denoted by the symbol '___'.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : frequency; f

28. As we know, anything given to us in the form of number or statement, etc., which can be used for further calculation and understanding is called data.

Therefore, in our discussion the scores we use for further calculation and understanding about the students may be called _____.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : data

29. Suppose we have the following set of raw scores on an achievement test. And, from these scores we try to understand the nature of performance of the students.

15	13	14	13	15	17	16
22	20	24	24	20	24	21
8	22	14	8	23	12	15
23	18	24	15	6	25	
9	25	23	25	7	14	

It may be easily noted that this is a set of raw scores which have not been grouped in any manner. Accordingly, it may be called un_____ data.

Suppose the same set of scores have been grouped under different class intervals as below.

C.I.	f
23 - 25	10
20 - 22	5
17 - 19	3
14 - 16	7
11 - 13	3
8 - 10	3
5 - 7	2

This may be called _____ data.

(Write the missing words in the above sentences in the answer sheet)

The correct answer is : ungrouped; grouped

30. Now, let us examine Table 4 presented in Frame 24. The data presented in this table can be called _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : grouped data

31. We may say that in the grouped data we have the frequencies distributed into different class intervals. In other words, when we present the data in grouped form, as in Table 4, it tells us the distribution of frequencies into different class intervals.

Accordingly, data presented in grouped form are also referred to as forming a _____ distribution.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : frequency

We have, therefore, learnt that data in the form of raw scores are referred to as ungrouped data; and, they are referred to as grouped data, when they are grouped under different class intervals. Grouped data which specify the distribution of frequencies into different class intervals may also be called frequency distribution.

We also noted that from grouped data the teacher can know several points about the general nature of the class and of the positions of individual students which he cannot know directly from ungrouped data.

Still you may be wondering as to how exactly should we group the data, i.e., how to prepare a frequency distribution from a set of raw scores.

32. Let us examine the frequency distribution presented in Table 4 and try to answer the above question. In Table 4, we have the following frequency distribution.

C.I.	f
23 - 25	10
20 - 22	5
17 - 19	3
14 - 16	7
11 - 13	3
8 - 10	3
5 - 7	2

In the above, the first column, i.e., the column, 'C.I.' gives the _____ into which the scores have been grouped.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : class intervals

33. Each class interval represents a group of 3 scores. For instance, class interval 8 - 10 represents the group of scores 8, 9 and 10, class interval 11 - 13 represents the group of scores 11, 12 and 13, and so on. Since each group consists of exactly 3 scores we may consider '3' as the size of each group.

But, these groups are actually the class intervals.
 Therefore, we may also say that '3' is the _____
 of the class interval in the particular frequency
 distribution.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : size

The 'size' of the class interval is also known as the 'length' of
 the class interval.

34. Suppose we rewrite the frequency distribution of the above
 example as follows :

Table 5 : Frequency distribution

C.I.	f
5 - 6	1
7 - 8	3
9 - 10	1
11 - 12	1
13 - 14	4
15 - 16	5
17 - 18	2
19 - 20	3
21 - 22	3
23 - 24	7
25 - 26	3

Here, the size or length of the class interval is _____
 as each class interval represents a group of '2' scores.

(Write the missing number in the above sentence in the answer sheet)

The correct answer is : '2'

35. We may also rewrite the same data in the following two forms.

Table 6		Table 7	
C.I.	f	C.I.	f
4 - 7	2	5 - 9	5
8 - 11	3	10 - 14	5
12 - 15	9	15 - 19	8
16 - 19	4	20 - 24	12
20 - 23	8	25 - 29	3
24 - 27	7		

Length of the class interval in Table 6 is ____ as each class interval corresponds to a group of 4 scores. And, in Table 7 length of the class interval is ____.

(Write the missing numbers in the above sentence in the answer sheet)

The correct answer is : 4; 5

Thus, we noted that merely the range of a set of raw scores cannot clearly tell us about the achievement or abilities of a group. For that purpose we have to divide the range into smaller units called class intervals, and prepare a frequency distribution.

Two questions would naturally arise while preparing a frequency distribution from a given set of raw scores.

- (1) Into how many smaller units, i.e., class intervals should we divide the range?
- (2) What should be the size of each class interval?

36. Let us examine the set of class intervals given in Tables 4 and 5 which have been reproduced below.

Table 4

C.I.	f
23 - 25	10
20 - 22	5
17 - 19	3
14 - 16	7
11 - 13	3
8 - 10	3
5 - 7	2

Table 5

C.I.	f
25 - 26	3
23 - 24	7
21 - 22	3
19 - 20	3
17 - 18	2
15 - 16	5
13 - 14	4
11 - 12	1
9 - 10	1
7 - 8	3
5 - 6	1

The class intervals in both the tables represent the set of raw scores given in Table 1.

Size of each class interval in Table 4 = ____.

Size of each class interval in Table 5 = ____.

(Write the missing numbers in the above in the answer sheet)

The correct answer is : 3; 2

37. Size of class interval in Table 5 is smaller than the size of class interval in Table 4.

We may also observe that the number of class intervals in Table 4 is 7 and it has increased to 11 in Table 5.

Thus, we may say that as the number of class intervals increases the _____ of class interval decreases.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : size

38. From the above frame it is clear that the size of class interval in a frequency distribution is related to the number of class intervals in the distribution.

Therefore, if we decide about the number of class intervals it would tell us about the _____ of class interval also.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : size

39. In practice, it is generally found that for satisfactory grouping of raw scores, number of class intervals should be between 10 and 15.

According to this consideration number of class intervals in Table 5 is _____ satisfactory than the number of class intervals in Table 4.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : more

40. We noted that class intervals are formed by dividing the range of a set of raw scores into several smaller units, i.e., class intervals.

In Frame 39, it was noted that we may, generally, have 10 to 15 class intervals in a frequency distribution.

Thus, when a set of raw scores are given, in order to form a frequency distribution we may first divide the _____ of scores by 15.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : range

41. Also, when we divide the range by the number of class intervals, i.e. 15, it tells us about the approximate _____ of the class interval suitable for preparing the frequency distribution.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : size

42. In other words, we may say that we decide about the satisfactory size of class interval in a frequency distribution by dividing the range of scores by 15. We may write this as

$$\frac{\text{Range}}{15} = \text{_____ of the class interval}$$

(Write the missing word in the above in the answer sheet)

The correct answer is : size

43. Thus, the first step in preparing a frequency distribution is to decide about the approximate size of class interval by dividing the _____ by 15.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : range

44. There is another point to be considered in deciding about the size of class interval. Through practice, it is found convenient for further calculations to take an odd number as the size of class interval.

Thus, we may follow two guidelines in deciding about the size of class interval.

Firstly, find out the approximate size of class interval by dividing the _____ by 15.

Secondly, let the size of class interval be an _____ number.

(Write the missing words in the above sentences in the answer sheet)

The correct answer is : range; odd

It is important to note that these are not rules to be strictly followed. They are only guidelines to be had in mind for the sake of convenience of further calculation.

45. Let us consider the set of scores given in Table 1. For this set Range is : $25 - 6 = 19$. Therefore, approximate size of class interval may be calculated as follows :

$$\frac{\text{Range}}{15} = \frac{19}{15} = 1.266$$

Although 1 is the nearest whole number we cannot have 1 as the size of class interval. The next nearest number has to be taken. Therefore, size of class interval can be taken as _____.

(Write the missing number in the above sentence in the answer sheet)

The correct answer is : 2

46. With 2 as the size of class interval we may group the set of raw scores given in Table 2 as follows.

C.I.	f
5 - 6	1
7 - 8	3
9 - 10	1
11 - 12	1
13 - 14	4
15 - 16	5
17 - 18	2
19 - 20	3
21 - 22	3
23 - 24	7
25 - 26	3

Here, the number of class intervals is _____ and the size of the class interval is _____.

(Write the missing numbers in the above sentence in the answer sheet)

The correct answer is : 11; 2

47. We said that number of class intervals in frequency distribution may be between 10 and 15. In the above grouping there are 11 C.I.s. But we also noted that, sometimes, it would be convenient for further calculation if we take the size of class interval to be an odd number. From this point of view we may rewrite the frequency distribution as follows with 3 as the size of class interval.

C.I.	f
5 - 7	2
8 - 10	3
11 - 13	3
14 - 16	7
17 - 19	3
20 - 22	5
23 - 25	10

Here, the number of class intervals is _____ and the size of class interval is _____.

(Write the missing number in the above sentence in the answer sheet)

The correct answer is : 7; 3

Although the number of C.I.s would be less than 10, from the point of view of convenience, it is not wrong to take '3' as the size of the class interval in the above case.

48. Consider the following set of raw scores.

40	56	67	71	82	86	95
43	59	67	75	82	88	102
43	62	68	75	82	90	127
46	64	68	76	82	90	
46	64	69	76	82	91	
46	66	69	78	83	91	
54	66	69	80	84	92	

Highest score = 127

Lowest score = 40

range = _____ - _____ = _____

$\frac{\text{range}}{15} = \frac{87}{15} = \underline{\hspace{1cm}}$

Therefore, the size of the class interval can be = ____.

(Calculate and write the missing numbers given above in the answer sheet)

The correct answer is : range = $127 - 40 = 87$

$$\frac{\text{range}}{15} = \frac{87}{15} = 5.8$$

size of the class interval = 5

Although 6 is the nearest whole number, we may take 5 as the size of the class interval since 5 is an odd number.

So far, we have learnt the way to decide about suitable size of the class interval and the number of class intervals in preparing a frequency distribution.

Now, we shall try to learn the actual way of writing the class intervals after deciding about the size of C.I.

However, before going to this we shall learn one more point about class intervals.

49. Suppose we have classified a group of raw scores and for the C.I. 8 - 10 the frequency is 3. This indicates that in the given set of raw scores there are 3 scores which are not less than 8 but not more than 10.

In other words, the numbers 8 and 10 set the limits for the scores that may be included in the class interval 8 - 10. Further, 8 and 10 are the lowest and the highest scores that may be included in the C.I., 8 - 10.

Accordingly, the numbers 8 and 10 are called the lower _____ and the _____ limit of the class interval, 8 - 10.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : limit; upper

50. In class interval 23 - 25, the lowest score included will be 23 and the highest score will be 25. So, we have

Lower limit of this C.I. : ____.

Upper limit of this C.I. : ____.

(Write the missing numbers in the above expressions in the answer sheet)

The correct answer is : 23; 25

51. The lowest and the highest scores represented in a class interval are called the limits of the class interval. And, the lowest score included in the interval is taken as the lower _____ and the highest score included as the upper _____ of the class interval.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : limit; limit

Now, let us come to the question as to how to write out the class intervals for a frequency distribution.

52. Suppose we are preparing a frequency distribution from the raw scores given in Table 1. Here the lowest score is 5. Let the size of the class interval be 3. Then with 5 as the lower limit, the first class interval would include the 3 scores 5, ____, ____.

(Write the missing numbers in the above sentence in the answer sheet)

The correct answer is : 6, 7

53. Thus, the first class interval in the frequency distribution will be 5 - 7, where 5 is the lower _____ and 7 is the _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : limit; upper limit

54. Once we write the first class interval, there is a convenient way of writing down the other class intervals. We have to separately add the size of the C.I. to the lower and the upper limits of this C.I. This gives us the lower and the upper limits of the next class interval.

Suppose we have started with the class interval, 5 - 7.

Here, the lower limit is _____ and the upper limit is _____, and the size of the class interval is 3.

(Write the missing numbers in the above sentence in the answer sheet)

The correct answer is : 5; 7

55. Then, the lower and the upper limits of the second class interval would be $5 + 3 = 8$ and $7 + 3 = 10$ respectively. We now write the first two class intervals as 5 - 7, 8 - 10. Similarly, by adding 3 to the lower and the upper limits of the C.I. 8 - 10 we can get the next class interval. Thus for the raw scores given in Table 1 we will have 7 class intervals with 23 - 25 as the last class interval.

Class Intervals

5 - 7

8 - 10

23 - 25

(Write in the answer sheet all class intervals in the above grouping)

The correct answer is :

Class Intervals

5 - 7

8 - 10

11 - 13

14 - 16

17 - 19

20 - 22

23 - 25

-
56. Let us consider another example. Suppose 5 is the size of the C.I. Let the first and the last class intervals be 40 - 44 and 80 - 84. Then we have the second class interval as 45 - 49 where 45 is got as $40 + 5$ and 49 as $44 + 5$. Continuing on the same lines, we will have

Class Intervals

40 - 44

45 - 49

80 - 84

(Write in the answer sheet all the class intervals in the above grouping)

The correct answer is :

Class Intervals

40 - 44

45 - 49

50 - 54

55 - 59

60 - 64

65 - 69

70 - 74

75 - 79

80 - 84

We have, therefore, learnt about an easy way of writing down the different class intervals in a frequency distribution.

-
57. We noted that for a class interval 40 - 44 we may consider 40 and 44 as the lower and the upper limits, respectively. Similarly, 45 is the lower limit and 49 is the upper limit of the C.I. 45 - 49. Thus, the C.I. 40 - 44 will include scores from 40 to 44 and the C.I. 45 - 49 will include scores from 45 to 49.

Suppose there are two scores 44.25 and 44.75. To which class interval should these scores belong?

(Write your answer in the answer sheet)

The correct answer is :

44.25 belongs to the C.I. 40 - 44
and 44.75 belongs to the C.I. 45 - 49

58. Although, 44 is written as the upper limit of the C.I. 40 - 44, we know that all scores less than 44.5 are taken to be approximately equal to 44 only. Thus, actually, we may say that 44.5 is the upper limit of the class interval 40 - 44. Similarly 44.75 is taken to be approximately equal to 45 and thus included in the class interval 45 - 49. Again, therefore, we may consider 44.5 as the actual lower limit of the class interval 45 - 49.

Thus, we have that 44.5 is the _____ upper limit of the class interval 40 - 44 and 44.5 is taken as the _____ lower limit of the class interval 45 - 49.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : actual; actual

-
59. On the same lines we may say that the actual lower limit of the class interval 40 - 44 is 39.5 as all scores above 39.5 would be included in the class interval 40 - 44. Thus, in terms of actual lower and upper limits we may write the C.I. 40 - 44 as 39.5 - 44.5. Similarly, we may write the class interval 45 - 49 in terms of actual limits as _____.

(Write the missing term in the above sentence in the answer sheet)

The correct answer is : 44.5 - 49.5

60. Thus, if a C.I. is given in terms of scores as 40 - 44, we may express them in terms of actual limits by subtracting 0.5 from the given lower limit and by adding 0.5 to the given upper limit. Thus we have,

Actual lower limit of the C.I. 40 - 44 = $40 - 0.5 =$ _____

Actual upper limit of the C.I. 40 - 44 = $44 + 0.5 =$ _____

(Write the missing numbers in the above expressions in the answer sheet)

The correct answer is : 39.5; $44 + 0.5 = 44.5$

61. Therefore, we may write the C.I.s for any data in the following two ways.

I	II
Class Intervals	Class Intervals
23 - 25	22.5 - 25.5
20 - 22	19.5 - 22.5
17 - 19	16.5 - 19.5
14 - 16	13.5 - 16.5
11 - 13	10.5 - 13.5
8 - 10	7.5 - 10.5
5 - 7	4.5 - 7.5

Of these, in the second, the class intervals have been written in terms of _____ limits.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : actual

We have learnt how to decide about the size of class intervals and write out the class intervals accordingly.

We noted that in a frequency distribution the column denoted by 'f' gives the frequency of different class intervals. Now, we shall learn an easy way of finding out these frequencies.

62. Let us take the following set of raw scores.

6	12	15	17	21	23	25
7	13	15	18	22	24	25
8	13	15	19	22	24	25
8	14	15	20	23	24	
9	14	16	20	23	24	

We can note how many scores are there in each class interval by examining the set of raw scores in an order; we mark a tally against the class interval whenever we find a score in that class interval. Each tally is noted by a mark '/' and 5 tallies are, generally, noted in the form |||| .

For instance, by examining the set of raw scores we find that there are 10 scores in the C.I. 23 - 25 and it is indicated by the tallies |||| |||| . Similarly, the tallies |||| indicate that 5 scores are there in the C.I. 20 - 22.

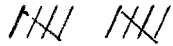






Class Intervals	Tallies
23 - 25	
20 - 22	
17 - 19	
14 - 16	
11 - 13	
8 - 10	
5 - 7	

(Complete the 'Tallies' column in the above table and write the table in the answer sheet)

The correct answer is :

Class Intervals	Tallies
23 - 25	
20 - 22	
17 - 19	///
14 - 16	
11 - 13	///
8 - 10	///
5 - 7	

63. Now we may add the tallies against each C.I. and write them out in a separate column.

Class Intervals	Tallies	Total
23 - 25		10
20 - 22		5
17 - 19		3
14 - 16		7
11 - 13		3
8 - 10		3
5 - 7		2

Now, what do the numbers 10, 5, 3, 7, etc. in the third column represent?

(Write your answer in a sentence in the answer sheet)

You are right if your answer is similar in meaning to the following :

10, 5, 3, etc. represent the total number of students with scores between 23 - 25, 20 - 22, 17 - 19, etc. respectively.

64. We may note that these numbers in the third column actually tell us how frequent are the scores appearing in the corresponding class intervals.

In other words, these numbers 10, 5, 3, etc. indicate the _____ of the different class intervals, 23 - 25, 20 - 22, 17 - 19, etc., respectively. We may, therefore, denote that column by the letter 'f'.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : frequency

65. Take the set of scores given in the Frame 62 and prepare a frequency distribution for the following set of class intervals.

Class Intervals	Tallies	f
24 - 25		
22 - 23		
20 - 21		
18 - 19		
16 - 17		
14 - 15		
12 - 13		
10 - 11		
8 - 9		
6 - 7		

(Write the complete table of frequency distribution in the answer sheet)

The correct answer is : frequencies are, respectively,
7, 5, 3, 2, 6, 3, 0, 3, 2

66. From a frequency distribution, as we noted earlier we can try to understand the nature of the distribution of scores.

In the frequency distribution the total set of scores is divided into several small groups called _____
_____ and also the distribution specifies the exact
_____ of students belonging to each group.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : class intervals; number

67. Consider the frequency distribution presented in frame 62.

We know that there are 33 scores in all which have been distributed into different class intervals. This number 33 is denoted by 'N'. Therefore, in the present case $N = \underline{\hspace{2cm}}$.

Now, add all the frequencies, i.e. all the numbers in the column 3 of the table given in Frame 63. The sum obtained may be represented by $\sum f$, which means sum of all 'f' i.e. frequencies. In the present case $\sum f = \underline{\hspace{2cm}}$.

(Write the missing numbers in the above in the answer sheet)

The correct answer is : 33; 33

It may be observed that $\sum f = N = 33$

68. In fact, in any frequency distribution 'f' denotes the number of scores in different class intervals. Therefore, the total of these frequencies i.e. $\sum f$ should naturally give the total number of scores, i.e. N. Thus, in any frequency distribution $\sum f$ would be always equal to $\underline{\hspace{2cm}}$.

(Write the missing term in the above sentence in the answer sheet)

The correct answer is : N

Let us now try to learn how we may represent distribution of scores, graphically. Let us take the distribution presented in Frame 63 and try to understand how it may be graphically represented.

69. Consider the following figure

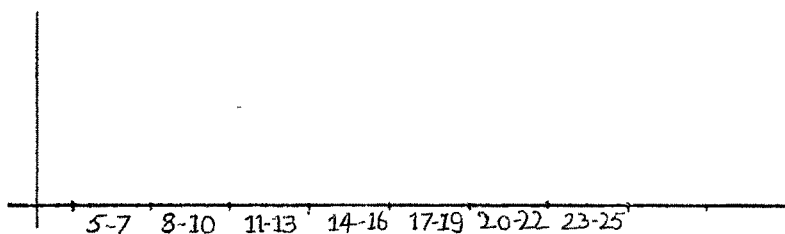


Figure 1

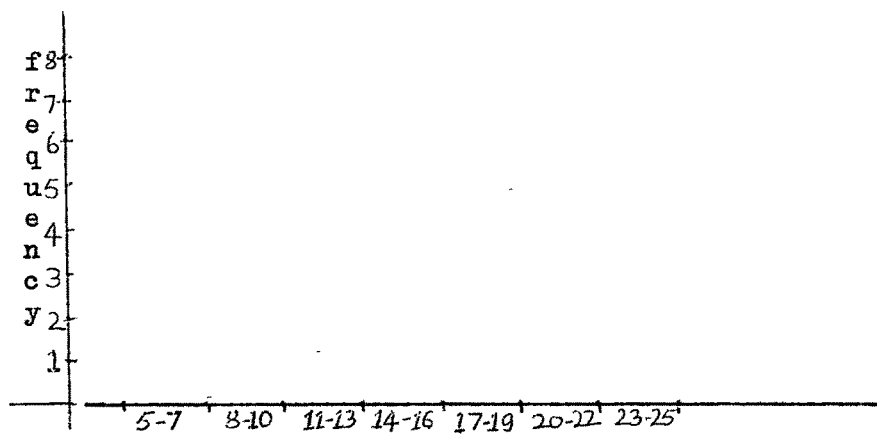
Here, the X-axis has been divided into seven blocks of equal width. Each of these is taken to represent

a _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : class interval

70. Now, let us study the following figure



Class interval

Figure 2

Here, markings on the Y-axis represent the _____.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : frequency

71. Finally, the frequency distribution may be represented as follows.

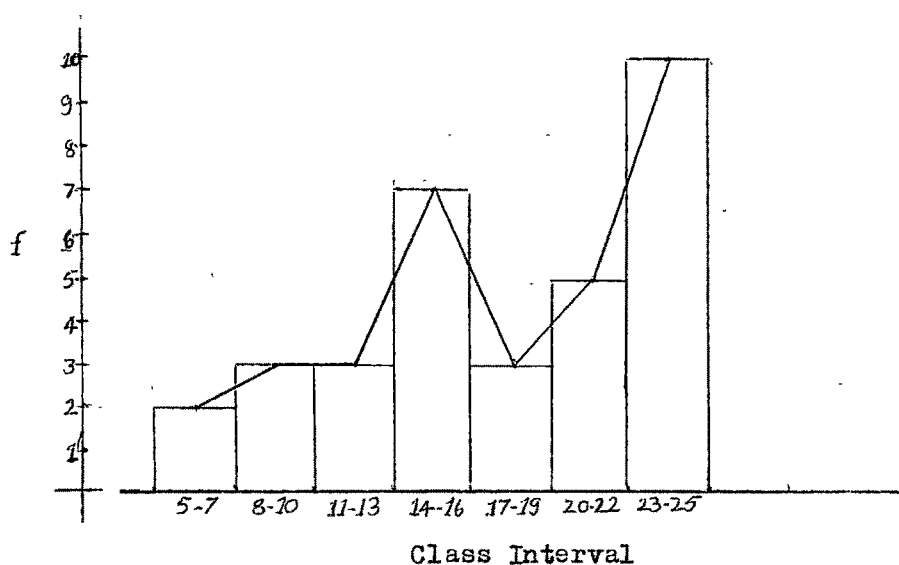


Figure 3

We find in the above figure several rectangles. Such a figure is called a 'histogram'.

Each rectangle in the histogram has for its width, the _____ of a class interval.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : size or length

72. We may also observe that the rectangles are of different height and the height of each rectangle represents the _____ of scores in the corresponding class interval.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : frequency

-
73. From the above histogram the teacher can understand several aspects about the nature of performance of the group.

For instance, as we noted, the heights of different rectangles represent the _____ of students whose scores lie in different class intervals representing different levels of performance.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : number

74. By comparing the heights of the rectangles teacher can get a picture of the performance of the group as a whole. It tells him about _____ of students with different levels of _____ such as those obtaining maximum score, or those with least score, or those with average score, etc.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : number; performance or achievement

75. In Figure 3 (Frame 71) we find lines joining points A, B, C, D, etc. We may easily see that these points are actually the _____ points of the different class intervals.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : midpoints

76. Also, each of these points, A, B, C, D, etc., is at a height which represents the _____ of the particular class interval.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : frequency

77. Thus, we find that line AB, BC, CD, etc. form a polygon (i.e., a figure with more than four sides) joining points which represent the frequency of scores in the class interval.

Such a polygon is, therefore, referred to as a _____

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : frequency polygon

78. Like the histogram, frequency polygon also helps the teacher in making comparisons of different groups of students within a class. Also, he can know the position of each _____ in relation to the positions of others in the class.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : individual

79. Thus, we have learnt to represent frequency distribution, graphically, in two ways. They are -

1. _____
2. _____

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : 1. Histogram

2. Frequency polygon

Now, we shall try to learn the different ways of obtaining numbers from ungrouped and grouped data which represent the average performance of the group.

80. In fact, we already know a way to find out the average of a set of numbers. Suppose, the teacher has administered a test to four students and has obtained the following scores : 65, 68, 70, 73.

The average of these four scores

$$= \frac{65 + 68 + 70 + 73}{4} = \frac{\quad}{4} = \underline{\quad}$$

(Write the missing number in the above in the answer sheet)

The correct answer is : $\frac{276}{4} = 69$

81. Average determined by the above method is referred to as Mean and represented by the letter M. Thus, the arithmetic mean for the scores presented above is = .

(Write the missing number in the above in the answer sheet)

The correct answer is : 69

We may note that this 'mean' represents the typical value in a set of scores.

82. Apart from this arithmetical average, we also, come across two more types of averages in statistics.

Consider the following table of scores.

Scores

40
 36
 33
 33
 32
 30
 29 --- Median
 28
 28
 28
 27
 25
 20

Both above and below the mark we find equal number of scores. This indicates that the mark is at the ____-point of the set of scores.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : mid-point

83. This mid-point of a set of scores is referred to as the median of the set of scores.

In the above case score 29 can be taken as the _____.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : median

It may be observed that median divides the set in such a way that 50% of the scores lie above as well as below that point. Thus, we may consider median as another typical value representing the set of scores.

84. In daily life situations, we find people doing certain things most frequently. We say that it is the fashion or the mode of life.

In test scores also we find certain scores to be most frequently appearing.

Such a score which is most frequent may be called the _____ of the scores.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : mode

85. For instance, consider the set of scores presented in the Frame 82. We find that the score 28 is the most frequent one. Therefore we may consider 28 as the _____ of the scores.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : mode

86. Thus, we have noted about obtaining three numbers which would represent the typical value of the scores of the group. These values indicate the nature of the particular group in terms of how much do students tend to be nearer the central point of the whole group.

Accordingly, these numbers, namely, mean, median, and mode, are called measures of _____ ency.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : central tendency

87. We may say that the three measures of central tendency are :

1. _____
2. _____
3. _____

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : 1. Mean; 2. Median; 3. Mode

In the above we noted how to find the three measures of central tendency when the scores are small in number and they are not grouped.

88. Consider the following set of grouped scores.

Class Interval C.I.	Frequency f
10 - 19	15
20 - 29	12
30 - 39	10
40 - 49	3

$$\sum f = N = \underline{\hspace{2cm}}$$

(Write the missing number in the above expression in the answer sheet)

The correct answer is : 40

89. We may note an important point related to the scores included in the class intervals.

In any grouped data since actual scores are not given, we may consider the mid-point of the _____ to represent the scores in it.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : class interval

-
90. For instance, consider a class interval, 8 - 10. It represents three scores, 8, 9 and 10. Therefore, mid-point of this class interval is ____.

(Write the missing number in the above sentence in the answer sheet)

The correct answer is : 9

91. We may note that the mid-point of a class interval is easily calculated by adding the lower and the upper limits of the C.I. and dividing the sum by 2. Suppose, you have the C.I. 40 - 44. Mid-point of this class interval is given by

$$\text{Mid-point} = \frac{40 + 44}{2} = \frac{\quad}{2} = \quad$$

(Write the missing numbers in the above expression in the answer sheet)

The correct answer is : $\frac{84}{2} = 42$

92. Similarly for a class interval 10 - 19,

$$\text{Mid-point} = \frac{\quad + \quad}{2} = \frac{\quad}{2} = \quad$$

(Write the missing numbers in the above expression in the answer sheet)

The correct answer is : $\frac{10 + 19}{2} = \frac{29}{2} = 14.5$

93. Mid-point of a class interval is, generally, denoted by the letter 'x'.

Examine the following :

C.I.	f	x
10 - 19	15	14.5
20 - 29	12	24.5
30 - 39	10	34.5
40 - 49	3	44.5

In this table, we may note that numbers in the column 'x', i.e., 14.5, 24.5, etc. correspond to the _____ of the class intervals.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : mid-points

94. As we know, mean (M) is given by

$$M = \frac{\text{sum of all scores}}{\text{total number of scores}}$$

Here, we can easily find out the total number of scores (N) as we always have $\sum f = \underline{\hspace{2cm}}$.

(Write the missing term in the above expression in the answer sheet)

The correct answer is : N

We shall, therefore, find out a method of calculating the sum of all scores.

95. In a frequency distribution, scores are grouped under different class intervals. Therefore, in order to get the sum of all scores, we may first calculate the sum of scores

in each _____ which may then be added
to obtain the sum of all scores in the distribution.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : class interval

96. We said that the mid-point of a class interval may be taken to represent all the scores in that class interval. Therefore, we can obtain the sum of scores in a class interval by multiplying the _____ of the class interval by the number of scores in it, i.e. frequency.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : mid-point

97. For instance, suppose in a frequency distribution we have a class interval 23 - 25 with the frequency 10. Then the mid-point of the class interval will be $\frac{23+25}{2} = 24$. And the sum of scores in this class interval will be

$$\begin{array}{ccccccc} \text{frequency} & \times & \text{mid-point} & & & & \\ = & \underline{\hspace{1cm}} & \times & \underline{\hspace{1cm}} & = & \underline{\hspace{1cm}} \end{array}$$

(Write the missing numbers in the above expression in the answer sheet)

The correct answer is : 10 x 24 = 240

98. Therefore, if 'f' is the frequency of a class interval and 'x' is the mid-point then sum of scores in the class interval is given by _____ \times _____, i.e. fx.

(Write the missing terms in the above sentence in the answer sheet)

The correct answer is : f x x

99. Once we have calculated the sum of scores in different class intervals, we can easily find out the sum of all scores in the distribution by adding fx of different _____. Thus, the sum of all scores in the distribution will be given by $\sum fx$.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : class intervals

100. Let us consider the following distribution.

C.I.	f	x	fx
5 - 7	2	6	12
8 - 10	3	9	27
11 - 13	3	12	..
14 - 16	7	15	..
17 - 19	3	18	..
20 - 22	5	21	..
23 - 25	10	24	..

In the above, we have that for class intervals 5 - 7 and 8 - 10, fx is $2 \times 6 = 12$ and $3 \times 9 = 27$, respectively.

Similarly, fx for class intervals 11 - 13, 14 - 16, 17 - 19, 20 - 22 and 23 - 25, are _____, _____, _____, _____, and _____, respectively.

(Write the missing numbers in the above sentence in the answer sheet)

The correct answer is : 36, 105, 54, 105, 240

101. Thus, the table in the above frame can be completed and written as follows :

C.I.	f	x	fx
5 - 7	2	6	12
8 - 10	3	9	27
11 - 13	3	12	36
14 - 16	7	15	105
17 - 19	3	18	54
20 - 22	5	21	105
23 - 25	10	24	240

For this distribution we have sum of all scores

$$\begin{aligned}
 &= \sum fx \\
 &= 12 + 27 + \dots\dots\dots \\
 &= \underline{\hspace{2cm}}
 \end{aligned}$$

(Complete the above expression and write the completed expression in the answer sheet)

The correct answer is : $12 + 27 + 36 + 105 + 54 + 105 + 240$
 $= 576$

102. Now, as we noted earlier, mean (M) is given by

$$M = \frac{\text{sum of all scores}}{\text{total number of scores}} = \frac{\sum fx}{N}$$

For the distribution presented in Frame 101, we have

$$\sum fx = 576 \text{ and } N = \sum f = 33.$$

Therefore,

$$M = \frac{\sum fx}{N} = \frac{576}{33} = \underline{\hspace{2cm}}$$

(Write the missing term in the above expression in the answer sheet)

The correct answer is : 17.45

103. Let us consider another distribution.

C.I.	f	x	fx
10 - 19	15	14.5	217.5
20 - 29	12	24.5	294.0
30 - 39	10	34.5	345.0
40 - 49	3	44.5	133.5

Here, we have

$$\sum fx = \underline{\quad} + \underline{\quad} + \underline{\quad} + \underline{\quad} = \underline{\quad}$$

$$\text{and } N = \sum f = \underline{\quad}$$

(Write the missing terms in the above expressions in the answer sheet)

The correct answer is : $\sum fx = 217.5 + 294 + 345 + 133.5 = 990$
 $N = 40$

104. Thus, for the grouped data presented in the above frame,

$$M = \frac{\sum fx}{N} = \frac{990}{40} = \underline{\quad}$$

(Write the missing term in the above expression in the answer sheet)

The correct answer is : 24.75

We may observe that in the above method of calculating mean, calculation of fx , adding them and dividing them by N makes the method very long and complicated. Therefore, we shall learn another method of calculating mean which is shorter than the above method.

105. In this short method we first assume some number to be the mean for the whole group. And, then the mean (M) is obtained by adding a correction to the number assumed to be the mean. This method is referred to as _____ed _____ method or short method.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : assumed mean

106. Infact, we always choose the mid-point of one of the C.I.s in the distribution as the assumed mean (A.M.).

Suppose we have the following data.

C.I.	x	f
23 - 25	24	10
20 - 22	21	5
17 - 19	18	3
14 - 16	15	7
11 - 13	12	3
8 - 10	9	3
5 - 7	6	2

Let us take the mid-point of the class interval 14 - 16 as the assumed mean (A.M.)

Then, we have A.M. = _____

(Write the missing number in the above expression in the answer sheet)

The correct answer is : 15

-
107. After fixing up the assumed mean (A.M.), the actual mean (M) for the distribution has to be calculated using the formula

$$M = AM + ci$$

where, AM = Assumed mean

c is correction given by $c = \frac{\sum fx'}{N}$

i = size of class interval

For the distribution given in Frame 106, we have already chosen the assumed mean to be 15 and also, we know that the size of class interval is 3.

So, we have A.M. = _____

i = _____

(Write the missing terms in the above expressions in the answer sheet)

The correct answer is : 15; 3

108. Thus, in order to calculate the mean we have to calculate the correction 'c' given by the formula $c = \frac{\sum fx'}{N}$

Even in this formula we know the value of N for the above distribution. It is N = _____.

(Write the missing number in the above expression in the answer sheet)

The correct answer is : 33

Let us now try to understand what the symbol "x'" stands for and how to calculate fx'

109. x' actually stands for deviations of the midpoints of different class intervals from the assumed mean expressed in units of class interval.

Consider the following distribution.

C.I.	x	f
23 - 25	24	10
20 - 22	21	5
17 - 19	18	3
14 - 16	15	7
11 - 13	12	3
8 - 10	9	3
5 - 7	6	2

We have taken the midpoint of C.I. 14 - 16, i.e. 15 as the A.M.

Now, deviation of the mid-point of the class interval 17 - 19 is $18 - 15 = 3$.

Similarly, deviation for the C.I. 20 - 22 is $21 - 15 = 6$, and deviation for the C.I. 11 - 13 is $12 - 15 = -3$.

On the same lines deviations for the C.I.s, namely, 23 - 25, 8 - 10, and 5 - 7, are $24 - 15 = \underline{\hspace{2cm}}$, $9 - 15 = \underline{\hspace{2cm}}$, and $6 - 15 = \underline{\hspace{2cm}}$, respectively.

(Write the missing numbers in the above expressions in the answer sheet)

The correct answer is : 9, -6, -9

110. Thus we may rewrite the above table in the following way.

C.I.	x	f	Deviations from the A.M.
23 - 25	24	10	9
20 - 22	21	5	6
17 - 19	18	3	3
14 - 16	15	7	0
11 - 13	12	3	-3
8 - 10	9	3	-6
5 - 7	6	2	-9

Here, the entries in the 4th column, namely, 9, 6, 3, 0, -3, -6, -9, indicate that the mid-points of the corresponding class intervals deviate from the A.M. by so many score units.

These numbers can also be written in the following way.

$$9 = 3 \times 3, \quad 6 = 2 \times 3, \quad 3 = 1 \times 3, \quad 0 = 0 \times 3, \\ -3 = -1 \times 3, \quad -6 = -2 \times 3, \quad -9 = -3 \times 3.$$

Observe that in the above distribution size of a class interval is 3 score units. Therefore, we can also rewrite the above set of numbers, 9, 6, etc. as

$$9 = 3 \text{ C.I.}, \quad 6 = 2 \text{ C.I.}, \quad 3 = \underline{\quad} \text{ C.I.}, \\ 0 = 0 \text{ C.I.}, \quad -3 = \underline{\quad} \text{ C.I.}, \quad -6 = \underline{\quad} \text{ C.I.}, \\ -9 = \underline{\quad} \text{ C.I.}$$

(Write the missing numbers in the above expressions in the answer sheet)

The correct answer is : 3 = 1 C.I.
 -3 = -1 C.I.
 -6 = -2 C.I.
 -9 = -3 C.I.

111. We may rewrite the distribution table given in the Frame 110 as below.

C.I.	x	f	Deviations from the A.M.
23 - 25	29	10	3 C.I.
20 - 22	21	5	2 C.I.
17 - 19	18	3	1 C.I.
14 - 16	15	7	0 C.I.
11 - 13	12	3	-1 C.I.
8 - 10	9	3	-2 C.I.
5 - 7	6	2	-3 C.I.

Or we may also write the terms, 3 C.I., 2 C.I., etc. as simply 3, 2, 1, 0, -1, -2, -3, which mean that the deviations have been expressed in units of _____ and these deviations are noted by the symbol x' .

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : class interval

112. The distribution may then be written in the following way.

C.I.	x	f	x'
23 - 25	24	10	3
20 - 22	21	5	2
17 - 19	18	3	1
14 - 16	15	7	0
11 - 13	12	3	-1
8 - 10	9	3	-2
5 - 7	6	2	-3

Now from this table, fx' can be calculated by multiplying each x' by the corresponding f . For example,

$$fx' \text{ for the C.I. } 23 - 25 = 10 \times 3 = 30$$

$$fx' \text{ for the C.I. } 20 - 22 = 5 \times 2 = 10$$

$$fx' \text{ for the C.I. } 17 - 19 = _ \times _ = _$$

$$fx' \text{ for the C.I. } 14 - 16 = _ \times _ = _$$

$$fx' \text{ for the C.I. } 11 - 13 = _ \times _ = _$$

$$fx' \text{ for the C.I. } 8 - 10 = _ \times _ = _$$

$$fx' \text{ for the C.I. } 5 - 7 = _ \times _ = _$$

(Write the missing numbers in the above expressions in the answer sheet)

The correct answer is : $3 \times 1 = 3$; $7 \times 0 = 0$; $3 \times -1 = -3$;
 $3 \times -2 = -6$; $2 \times -3 = -6$.

113. In fact, we may rewrite the table in Frame 112 with one more column to present the fx' values for different C.I.s. It can be presented as below.

C.I.	x	f	x'	fx'
23 - 25	24	10	3	30
20 - 22	21	5	2	10
17 - 19	18	3	1	3
14 - 16	15	7	0	0
11 - 13	12	3	-1	-3
8 - 10	9	3	-2	-6
5 - 7	6	2	-3	-6

Now from the above table we can easily calculate $\sum fx'$.

we have $\sum fx' = 30 + 10 + 3 + 0 - 3 - 6 - 6$

=

(Write the missing number in the above expression in the answer sheet)

The correct answer is : 28

114. Now we can find out 'c' from the formula $c = \frac{\sum fx'}{N}$

We have $\sum fx' = 28$ and $N = 33$

Therefore, $c = \frac{\sum fx'}{N} = \text{---}$

(Write the missing numbers in the above expression in the answer sheet)

The correct answer is : $\frac{28}{33}$

115. Since we have calculated the value of 'c' we can substitute it in the formula for mean and calculate the mean M using the formula $M = A.M. + ci$

We have $A.M. = 15$

$c = \frac{28}{33}$

$i = 3$

$\therefore M = A.M. + ci$

$= \text{---} + \left\{ \frac{28}{33} \right\} \times \text{---}$

$= \text{---}$

(Write the missing numbers and the final calculated value in the answer sheet)

The correct answer is : $15 + \left\{ \frac{28}{33} \right\} \times 3$
 $= 17.54$

116. Let us consider another example

C.I.	f
10 - 19	8
20 - 29	4
30 - 39	5
40 - 49	10
50 - 59	5
60 - 69	5
70 - 79	3

The first step in calculating the mean (M) is to find out the _____ of different class intervals and write out the column 'x'.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : mid-points

117. Thus, we may rewrite the data as follows.

C.I.	x	f
10 - 19	14.5	8
20 - 29		4
30 - 39		5
40 - 49		10
50 - 59		5
60 - 69		5
70 - 79		3

Calculate the midpoints of the remaining intervals in the above table.

(Write the missing entries in the second column of the above table in the answer sheet)

The correct answer is : 24.5; 34.5; 44.5; 54.5; 64.5; 74.5

118. Let us consider the mid-point of the C.I. 40 - 49 as the Assumed Mean. Therefore, for the above distribution, we have,

$$\text{A.M.} = \underline{\hspace{2cm}}$$

$$N = \sum f = \underline{\hspace{2cm}}$$

$$i = \underline{\hspace{2cm}}$$

(Write the missing terms in the above expressions in the answer sheet)

The correct answer is : A.M. = 44.5

$$N = \sum f = 40$$

$$i = 10$$

119. We noted that x' denotes the _____ of the mid-points of different class intervals from the Assumed Mean in units of class interval. Deviations for the above table of frequencies are

(Write the missing parts in the above sentences in the answer sheet)

The correct answer is : deviations;

$$-3, -2, -1, 0, 1, 2, 3$$

120. Since we now have the values of f as well as x' we can easily find out the value of fx' which is the product of _____ (f) and the deviation (x').

(Write the missing part in the above sentence in the answer sheet)

The correct answer is : frequency

121. We can now rewrite the frequency distribution in Frame 117 by writing the midpoints (x), deviations (x') and fx' as follows.

G.I.	x	f	x'	fx'
10 - 19	14.5	8	-3	-24
20 - 29	24.5	4	-2	- 8
30 - 39	34.5	5	-1	- 5
40 - 49	44.5	10	0	0
50 - 59	54.5	5	1	5
60 - 69	64.5	5	2	10
70 - 79	74.5	3	3	9

From the above distribution we have

$$\begin{aligned}\sum fx' &= -24 - 8 - 5 + 0 + 5 + 10 + 9 \\ &= \underline{\hspace{2cm}}\end{aligned}$$

(Write the missing number in the above expression in the answer sheet)

The correct answer is : 13

122. We have $\sum fx' = 13$ and $N = 40$, therefore, we can calculate the value of c .

$$c = \frac{\sum fx'}{N} = \frac{\hspace{1cm}}{40} = \underline{\hspace{2cm}}$$

(Write the missing numbers in the above expression in the answer sheet)

The correct answer is : $c = \frac{\sum fx'}{N} = \frac{13}{40} = 0.325$

-
123. Since we have got the values of A.M., c and i , we can calculate the Mean for the distribution.

We have, A.M. = 44.5, $c = 0.325$, $i = 10$

$$\begin{aligned}\text{Therefore, } M &= \text{A.M.} + ci \\ &= \underline{\hspace{2cm}} + (0.325 \times \underline{\hspace{2cm}}) \\ &= \underline{\hspace{2cm}}\end{aligned}$$

(Write the missing terms in the above expression in the answer sheet)

The correct answer is : $44.5 + (0.325 \times 10)$
 $= 47.5$

We may note an important point regarding the particular class interval whose mid-point may be taken as the A.M. Generally, the interval which is at the middle and which has greater frequency is chosen for this purpose. However, Assumed Mean can be taken in any class interval. You may change the place of A.M. and try to find out the mean in the above problem.

Thus, we have learnt to calculate, one of the three measures of central tendency, viz., Mean (M) from grouped data. Let us now learn to calculate the Median, also, from grouped data.

Before going to the actual calculations we may note a point about the frequencies.

124. Suppose, in the table of frequencies considered, you start from below and go on adding the frequencies and writing them in a separate column. For instance, suppose we have $f = 2$ in the last C.I. And, we add this to the frequency in the next C.I., say, 3. Then, we have $2+3 = 5$ in the next C.I.

Here, we should remember that 5 yet represents frequency, but of not merely the second C.I. Instead, it is cumulative of all the frequencies upto that C.I. Thus, these frequencies which are obtained by adding to the frequency of a particular C.I. all frequencies below that C.I. are called _____ frequencies.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : cumulative

125. Consider the following table of frequencies.

C.I.	f	Cumulative frequency
23 - 25	10	
20 - 22	5	
17 - 19	3	
14 - 16	7	
11 - 13	3	8
8 - 10	3	5
5 - 7	2	2

(Write the remaining cumulative frequencies in the above table)

The correct answer is : 15, 18, 23, 33.

We may note that in the highest C.I. cumulative frequency will become equal to the total number of scores, i.e. N.

126. Now, we have the complete table of frequencies and cumulative frequency from which we may calculate the Median (Mdn).

As we know, Median refers to the particular score which represents the _____ of the distribution.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : mid-point

127. In other words, it is the point both above and below which we find half the number of the _____ number of scores in the distribution.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : total

128. Since, we should find half the total number of scores both above and below, Median refers to that point represented by half of the N , i.e. $N/2$.

Therefore, if $N = 33$ then,
median refers to the point

where the score value is $\frac{N}{2} = \frac{33}{2} = \underline{\hspace{1cm}}$

(Calculate and write the missing numbers in the above)

The correct answer is : $N/2 = 33/2 = 16.5$

129. Let us take the following distribution of frequencies.

C.I.	f	Cum.f.
23 - 25	10	33
20 - 22	5	23
17 - 19	3	18
14 - 16	7	15
11 - 13	3	8
8 - 10	3	5
5 - 7	2	2

Here, we have $N = 33$
length of C.I. $i = 3$

We said that we have to look for the score corresponding to the point $N/2$.

We also have got $N/2 = 33/2 = 16.5$

Since, all the scores in the particular range are included in the above distribution, we should also have the score corresponding to $N/2 = 16.5$.

Examine the cumulative frequencies. Mark the class interval in which the point 16.5 lies.

(Copy down the complete table in the answer sheet and mark the particular C.I.)

The correct answer is : class interval 17 - 19

While looking for the particular C.I. we may have in mind that the particular C.I. would have a cumulative frequency value of 16.5 ($N/2$) or more than that but not less than $N/2$ in any case.

130. Now, we have marked the C.I. in which the median lies.
Since the C.I. extends from 16.5 to 19.5, we have to find out the exact score which corresponds to 16.5

This is determined using the formula

$$\text{Mdn.} = l + \frac{N/2 - F}{f} \times i$$

Where, l = actual lower limit of the C.I. in which the Mdn lies

N = total number of scores

F = sum of all frequencies below that interval
(i.e. cum. f. below that C.I.)

f = frequency of the C.I. in which the
Mdn. lies

i = length of the C.I.

We have already noted the value of N and i as $N=33$ and $i=3$.
Mdn. lies in the C.I. 17 - 19.

Therefore, l = the actual lower limit of this C.I. = ____

F = cumulative frequency below this C.I. = ____

f = frequency of the particular C.I.
in which the median lies. = ____

(Note down the missing values in the above from the table of frequencies)

The correct answer is : $l = 16.5$; $F = 15$; $f = 3$.

131. Now, substituting in the formula, we obtain the value of the Median.

$$\begin{aligned}\text{Thus, Mdn.} &= l + \left\{ \frac{N/2 - F}{f} \right\} i \\ &= 16.5 + \left\{ \frac{16.5 - 15}{3} \right\} \times 3 \\ &= 16.5 + 1.5 = \underline{\hspace{2cm}}\end{aligned}$$

(Calculate the final value of the median and complete the above)

The correct answer is : Mdn. = 18

You may try to obtain the Mdn. for the other distribution also for which we have calculated the Mean.

132. Thus, we have learnt to determine two measures of central tendency from grouped data. These are -

1. _____

2. _____

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : 1. Mean; 2. Median

133. We may note here one main difference between these two measures, viz., Mean (M) and Median (Mdn.)

In calculating the mean as we know we consider all the scores. Therefore, scores at the extreme influence the value of M. But, this is not so in the case of Mdn.

For instance, if we have the following seven scores
27, 11, 10, 10, 12, 11, 10
then $M = 91/7 = 13$ and $Mdn. = 10$

Suppose, instead of 27 the first score is 14
then $M = 78/7 = 11.4$ and $Mdn. = 10$

Thus, Mdn. remains the same and is not affected by the extreme score. But, Mean we can see, had gone up to 13, mainly because of the extreme score of 27.

Thus, we may say that M is affected by _____
while Mdn. is _____ affected.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : extreme scores; not

Now, let us try to learn how we can obtain measures which indicate the variability of the group.

As in case of central tendency, here also we have different measures of variability.

-
134. In fact, we already know about a measure indicating the variability of the group. This we noted as the difference between the highest and the lowest score in any distribution.

Highest score - lowest score = _____.

(Write the missing word in the above in the answer sheet)

The correct answer is : Range

135. Refer to the set of scores presented in Table 2 at the beginning.

Range = _____.

(Write the missing number in the above in the answer sheet)

The correct answer is : Range = 19

Obtaining the second measure of variability is very similar to the procedure of calculating the Median.

136. In calculating the median we had to find out the score corresponding to the point $N/2$ i.e. the point above and below which $1/2$ of the total number of scores in the distribution lie.

On the same lines, we can also determine the score corresponding to the point $N/4$ i.e. the point below which $1/4$ of the total number of scores lie. In other words, it is the point below which one quartile of the total number of scores lie. Accordingly, this point is called the first _____ point of the distribution.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : quartile

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137. Similarly, we can determine the point below which $\frac{3}{4}$ of the scores i.e. three quartiles of the scores lie. This point is called the third _____ point.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : quartile

138. The first quartile point is denoted by Q_1 and the third quartile point is denoted by Q_3 .

After determining Q_3 and Q_1 we calculate the difference between Q_3 and Q_1 . Finally, we divide this difference by 2 so that it gives the variability or deviation in the (i.e. $\frac{1}{4}$ of the total length) of the distribution. This measure of variability is referred to as _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : quartile deviation

139. Quartile Deviation is generally, denoted by the symbol Q . We said that Q is obtained by dividing the difference between Q_3 and Q_1 by 2.

Thus we have $Q = \frac{\quad}{2}$

(Write the missing terms in the above expression in the answer sheet)

The correct answer is : $Q = \frac{Q_3 - Q_1}{2}$

140. From the above it is clear that in order to determine Q we should first find out the values of Q_1 and Q_3 .

We may remind ourselves, here, that Median is the point above and below which $1/2$ i.e. two quartiles of the scores lie. Thus median may be considered as the second _____ point or Q_2 .

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : quartile

Also, since we already know the method of calculating the median i.e. Q_2 we may apply the same procedure for calculating Q_1 and Q_3 .

141. As we did while calculating the Median, here also we have to first point out the cumulative frequency for the given distribution. Thus, we have

C.I.	f	Cum. f
23 - 25	10	33
20 - 22	5	23
17 - 19	3	18
14 - 16	7	15
11 - 13	3	8
8 - 10	3	5
5 - 7	2	2

Next, we have to find out the C.I. in which Q_1 lies. Q_1 corresponds to the point $N/4$. Therefore, we have to mark the C.I. in which $N/4$ th score lies. In the given distribution, we have $N = 33$.

Therefore $\frac{N}{4} = \frac{\quad}{4} = \quad$

(Write the missing numbers in the above expressions in the answer sheet)

The correct answer is : $\frac{N}{4} = \frac{33}{4} = 8.25$

142. We have got $N/4 = 8.25$: we may observe from the cum. f column in the distribution that the score corresponding to the point 8.25 lies in the class interval _____.

(Write the missing term in the above sentence in the answer sheet)

The correct answer is : 14 - 16

143. Now we may calculate Q_1 using the formula :

$$Q_1 = l + \left\{ \frac{N/4 - F}{f} \right\} \times i$$

where l = actual lower limit of the C.I. in which Q_1 lies.

N = total number of scores

F = sum of all frequencies below that interval
(i.e. Cum. f below the C.I. in which Q_1 lies)

f = frequency of the C.I. in which Q_1 lies

i = length of the C.I.

In the present case we have

$$\frac{N}{4} = \underline{\hspace{2cm}} \text{ and } i = \underline{\hspace{2cm}}$$

(Write the missing numbers in the above expressions in the answer sheet)

The correct answer is : $N/4 = 8.25$ and $i = 3$

144. Hence, we note that Q_1 lies in the class interval : 14 - 16
Therefore, l = actual lower limit of the C.I. : 14 - 16

$$= \underline{\hspace{2cm}}$$

$$F = \underline{\hspace{2cm}}$$

$$f = \underline{\hspace{2cm}}$$

(Write the missing numbers in the above expressions in the answer sheet)

The correct answer is : $l = 13.5$; $F = 8$; $f = 7$

145. Now, as we know the values of l , $N/4$, F , f and i , we may calculate Q_1 from the formula :

$$Q_1 = l + \left\{ \frac{N/4 - F}{f} \right\} \times i$$

$$= \underline{\hspace{2cm}}.$$

(Substitute the values of l , $N/4$, F , f and i in the formula and calculate the final value of Q_1)

The correct answer is : $Q_1 = 13.5 + \left\{ \frac{8.25 - 8}{7} \right\} \times 3$
 $= 13.607$

146. Now, let us try to find out Q_3 . Q_3 is the score corresponding to the point $3N/4$ in the distribution. Since $N = 33$, we have

$$\frac{3N}{4} = \underline{\hspace{2cm}}.$$

(Write the missing number in the above expression in the answer sheet)

The correct answer is : 24.75

147. From the Cum. f. column in the distribution we can observe that Q_3 lies in the class interval _____.

(Write the missing term in the above sentence in the answer sheet)

The correct answer is : 23 - 25

148. Now on the same lines which we followed for Q_1 we can calculate the value of Q_3 from the formula :

$$Q_3 = l + \left\{ \frac{3N/4 - F}{f} \right\} i$$

where l = actual lower limit of the C.I. in which Q_3 lies.

F = Cum. f below the C.I. in which Q_3 lies.

f = frequency of the C.I. in which Q_3 lies.

In the present case Q_3 lies in the C.I. 23 - 25

Therefore, we have : $l =$ _____

$F =$ _____

$f =$ _____

$N =$ _____

$i =$ _____

(Write the missing numbers in the above expressions in the answer sheet)

The correct answer is : $l = 22.5$; $F = 23$; $f = 10$; $N = 33$;
 $i = 3$

149. Now we can substitute the value of l , F , f , $3N/4$ and i in the formula and find out the value of Q_3 .

$$Q_3 = l + \left\{ \frac{3N/4 - F}{f} \right\} i$$

$$= \underline{\hspace{2cm}}.$$

(Substitute the value of l , F , f , $3N/4$ and i in the formula and calculate the value of Q_3 in the answer sheet)

The correct answer is : $Q_3 = 22.5 + \left\{ \frac{24.75 - 23}{10} \right\} \times 3$

$$= 22.925$$

150. Now that we have obtained the value of Q_1 and Q_3 we can calculate the value of Quartile Deviation, Q for the frequency distribution presented in Frame 141 using the formula

$$Q = \frac{Q_3 - Q_1}{2}$$

We have got $Q_1 = 13.697$

$$Q_3 = 22.925$$

Therefore, $Q = \frac{\hspace{2cm}}{2}$

(Write the missing numbers in the above expressions in the answer sheet)

The correct answer is : $Q = \frac{22.925 - 13.607}{2}$

$$= 4.659$$

151. We may note that this measure of variability, viz., Quartile Deviation takes into consideration the scores between the first and the third quartile points, i.e. the middle $1/2$ of the scores.

In other words, Q is obtained by considering only the middle _____% of the scores.

(Write the missing number in the above sentence in the answer sheet)

The correct answer is : 50

However, we shall next learn to obtain a measure of variability that would be based on the middle 68.26% of the scores. This measure is known as 'Standard Deviation' denoted by S.D. or by the symbol ' σ '.

For this, we may actually start with the details we would have for calculating the Mean. We may, then, proceed to do some more calculations.

152. In order to find out the S.D. from a frequency distribution, we may first of all note down the midpoints of the class intervals.

Let us consider the following distribution.

C.I.	f
23 - 25	10
20 - 22	5
17 - 19	3
14 - 16	7
11 - 13	3
8 - 10	3
5 - 7	2

Find out the midpoints of the different C.I.s in the above distribution.

(Write the midpoints of the C.I.s in the above distribution in the answer sheet)

The correct answer is : 24, 21, 18, 15, 12, 9, 6

153. We may rewrite the table of frequencies in the following way.

C.I.	f	x
23 - 25	10	24
20 - 22	5	21
17 - 19	3	18
14 - 16	7	15
11 - 13	3	12
8 - 10	3	9
5 - 7	2	6

Just as we did while calculating the Mean, here also we start with an Assumed Mean and then determine the S.D. or σ from the formula

$$\text{S.D.} = i \sqrt{\frac{\sum fx'^2}{N} - c^2}$$

Where, i = size of the class interval

f = frequency of the class interval

x' = deviations in units of C.I.

c is correction given by $c = \frac{\sum fx'}{N}$

N = total number of scores

Let us take the mid-point of the class interval 14 - 16 as the A.M. Then, we have,

A.M. = Midpoint of the C.I. 14 - 16

(Write the missing number in the above expression in the answer sheet)

The correct answer is : A.M. = 15

154. After deciding about the A.M. we can calculate the value of x' and fx' in the same way as we did in finding out the Mean. (Refer Frames 110 to 115 if you have forgotten the procedure) Then we can write the distribution as :

C.I.	x	f	x'	fx'
23 - 25	24	10	3	30
20 - 22	21	5	2	10
17 - 19	18	3	1	3
14 - 16	15	7	0	0
11 - 13	12	3	-1	-3
8 - 10	9	3	-2	-6
5 - 7	6	2	-3	-6

From the column fx' we can easily calculate the value of $\sum fx'$ by summing up all the entries in that column.

We have, $\sum fx' = \underline{\hspace{1cm}} + \underline{\hspace{1cm}} + \dots\dots\dots$
 $= \underline{\hspace{1cm}}$

(Write the missing terms in the above expression in the answer sheet)

The correct answer is : $\sum fx' = 30 + 10 + 3 - 3 - 6 - 6$
 $= 28$

155. We noted the formula for S.D. as

$$S.D. = \sqrt{1 \left[\frac{\sum fx'^2}{N} - c^2 \right]}$$

Here we already know the values of i and N . We have $i = 3$ and $N = 33$. Also, we can calculate c^2 as we know the value of $\sum fx'$

$$\begin{aligned} \text{We have } c^2 &= \left(\frac{\sum fx'}{N} \right)^2 \\ &= \left(\frac{\quad}{33} \right)^2 \end{aligned}$$

(Write the missing number in the above expression in the answer sheet)

The correct answer is : $c^2 = \left(\frac{28}{33} \right)^2$

156. Therefore, the only term, the value of which we have to find out is $\sum fx'^2$. In fact, from the table presented in Frame 154 we can easily calculate the value of fx'^2 for each class interval and then add them upto get $\sum fx'^2$.

fx'^2 is obtained by multiplying fx' by corresponding x' . For instance, for the class interval 23 - 25, we have

$$\begin{aligned} fx' \times x' &= \quad \times \quad \\ &= \quad \end{aligned}$$

(Write the missing numbers in the above expression in the answer sheet)

The correct answer is : $fx' \times x' = 30 \times 3 = 90$

157. On the same lines, we can determine the value of fx'^2 for each class interval and rewrite the table of distribution in the Frame 154 as follows which would include a separate column for fx'^2 also.

G.I.	x	f	x'	fx'	fx' ²
23 - 25	24	10	3	30	90
20 - 22	21	5	2	10	20
17 - 19	18	3	1	3	3
14 - 16	15	7	0	0	0
11 - 13	12	3	-1	-3	3
8 - 10	9	3	-2	-6	12
5 - 7	6	2	-3	-6	18

From the column fx'^2 in the above table we can calculate the value of $\sum fx'^2$ by adding all the fx'^2 .

We have, $\sum fx'^2 = 90 + 20 + \dots\dots\dots$
 $= \underline{\hspace{2cm}}.$

(Write the missing terms in the above expressions and calculate the value of $\sum fx'^2$ in the answer sheet)

The correct answer is : $\sum fx'^2 = 90 + 20 + 3 + 0 + 3 + 12 + 18$
 $= 146$

158. Now we have

$$i = 3; \quad \sum fx'^2 = 146; \quad N = 33 \quad \text{and} \quad c = \frac{28}{33}$$

$$\begin{aligned} \text{Therefore, S.D.} &= i \sqrt{\frac{\sum fx'^2}{N} - c^2} \\ &= 3 \sqrt{\underline{\hspace{2cm}} - \cancel{1} \cancel{1}^2} \\ &= \underline{\hspace{2cm}} \end{aligned}$$

(Substitute the value of $\sum fx'^2$, N and c in the formula and calculate the value of S.D. in the answer sheet)

The correct answer is : S.D. = $3 \sqrt{\frac{146}{33} - \left(\frac{28}{33}\right)^2}$

= 9.555

159. We have learnt about three measures of variability.

They are

1.

2.

3.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : 1. Range

2. Quartile Deviation (Q)

3. Standard Deviation (S.D. or)

160. As we have noted earlier Range is derived from only the two extreme scores, i.e. the _____ score and the _____ score; Quartile Deviation (Q) is obtained by considering the middle ____% of the score; and Standard Deviation (S.D. or) is obtained by considering the middle ____% of the scores.

(Write the missing words and numbers in the above sentences in the answer sheet)

The correct answer is : highest; lowest; 50%; 68.26%

161. All these measures of variability provide the teacher with a picture of the _____ of students in the group, i.e., they tell him how heterogeneous a group is with reference to particular aspects such as achievement in school subjects, and other abilities.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : variability

162. Also, we have learnt about three measures of central tendency (Averages) which tell us about the _____ nature of students in a group with reference to specific aspects.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : average or general

163. As a teacher you might sometimes come across the following type of situation.

Ashok was studying in 9th standard. He was very good in his studies. In the final examination, he got 60 marks in English and 60 marks in Social Studies. His English teacher praised Ashok in the class and said that he has done very well in English when compared to the performance of the group as a whole. Since Ashok had got 60 marks in Social Studies also, he assumed that he had done well in Social Studies.

Was Ashok right in assuming that 60 marks indicated good performance in both English and Social Studies?

(Write 'Yes' or 'No' in your answer sheet)

The correct answer is : No

In fact, Ashok's Social Studies teacher found that compared to the performance of the group as a whole, Ashok's performance was not very good. And, hence, he advised Ashok to improve himself in Social Studies.

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164. In the above instance we may note that Ashok's teachers considered his marks in the two subjects with reference to the performance of the whole group in the respective subjects. But, Ashok's mistake was that he compared the marks in the two subjects without considering the group performance in the respective subjects.

From this instance it is clear that raw scores of a student in different subjects have to be considered with reference to the performance of the group and therefore they cannot be directly _____ with one another.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : compared

165. In other words, we may say that in order to compare the scores of a student in different subjects we should convert the raw scores into a standard form.

Such converted scores which are in a standard form and which can be directly compared are generally called _____ scores.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : standard

Let us, now, learn how we can convert raw scores into standard scores.

166. We noted that while comparing the performance of a student on different subjects we should consider the general performance of the group as a whole in the respective subjects.

We already know that the performance of a group is indicated by two indices, viz., measures of _____ and measures of _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : central tendency; variability

167. We have also learnt the Mean, M is a measure of _____ and the standard deviation, _____, is a measure of _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : central tendency; variability

168. Therefore, we should be able to convert raw scores into standard scores by using the Mean and the Standard Deviation of the group in the different subjects.

The formula used for this purpose is

$$z = \frac{X - M}{\sigma}$$

where X : raw score

M : _____

σ : _____

z : Standard score

(Write the missing words in the above in the answer sheet)

The correct answer is : Mean; Standard Deviation

169. We may observe in the formula we take the difference of the raw score, X, from the mean, M, and convert them into ' '

units by dividing the difference by ' σ '. Accordingly, these converted scores (i.e. standard scores) are also known as ' ' scores.

(Write the missing part in the above sentence in the answer sheet)

The correct answer is : ' σ '

Since standard scores are represented by the symbol 'z', they are also referred to as z-scores.

170. Now, let us take the example of Ashok and see why he was wrong when he considered his performance to be equally good in both English and Social Studies based on raw scores.

Suppose we have the following details about performance of the group in the two subjects.

<u>English</u>	<u>Social Studies</u>
M = 45	M = 56
σ = 3	σ = 4

We also know Ashok's scores (i.e. raw scores)

$$X = 60 \qquad X = 60$$

Substituting the value in the formula

$$z = \frac{X - M}{\sigma}$$

We have for English

$$z = \frac{60 - 45}{3} = \frac{\quad}{3} = \quad$$

and for Social Studies

$$z = \frac{\quad}{4} = \frac{\quad}{4} = \quad$$

(Write the missing numbers in the above expressions in the answer sheet)

The correct answer is :

for English $z = \frac{15}{3} = 5;$

for Social Studies $z = \frac{60 - 56}{4} = \frac{4}{4} = 1$

171. Thus, standard scores representing Ashok's performance in the two subjects, viz., English and Social Studies are 5 and 1 respectively.

Comparing these two scores we can easily find that Ashok's performance in _____ was not as good as in _____.

(Write the missing words in the above sentence in the answer sheet)

The correct answer is : Social Studies; English

These standard scores can be directly compared because, distributions of standard scores will always have $M = 0$ and $\sigma = 1$.

172. An advantage of converting raw scores into standard scores is that with the help of standard scores teacher can directly _____ the performance of students in different subjects.

(Write the missing word in the above sentence in the answer sheet)

The correct answer is : compare

In fact, teacher can also compare students on different characteristics measured through different instruments by converting the raw scores into standard scores.
