APPENDIX - I

INTERVIEW SCHEDULES

Interview Schedule for Teachers

1. How do you perceive the ability of the backward students to understand your explanation ?
2 Are backward students regular in doing homework ? What is your experience ?
3. Do backward students ask doubts or attempt to improve ?
4. What is the parents contribution towards improving backward students performance ?
5. What is your experience of trying to improve the backward students ?
6. What method do you adopt for algebra ?
7. Do you have any special approach for the backward students ?
8. Are the text-books satisfactorily made ?
9. What are the special characteristics of backward students ?
10. Which are the topics that normally backward students find difficult ?

Interview Schedule for Students

1. How long you have been studying in the present school ?
2. What do you like about your school ?
3. Who are your favourite teachers ?
4. Who are your favourite mathematics teachers ?
5. What do you like about your favourite teacher ?
6. Which are your favourite subjects in order of preference ?
7. Which headmaster/ Principal do you like ?
8. What qualities of theirs do you like ?
9 What did you like about the remedial programme ?
10. How do you feel about the investigator ?
11. What are your hobbies ?
12. What would you like do in future ?

Interview Schedule for Parents

1. How has your ward performed academically so far ?
2. What is your comment about his/her behaviour at home ?
3. Have you observed any difference in behaviour after he/she has come in high school ?
4. What is your opinion about his/her overall performance ?

2 OPERATIONS ON WHOLE NUMBERS

1. **Introduction**

We can perform the fundamental operations of additions, subtraction, multiplication and division on whole numbers. Let us study some simple properties of these fundamental operations on whole numbers.

2. **Properties of Addition**

Property I: The sum of two whole numbers is a whole number

Illustrations: We know that

(i) $7 + 4 = 11$

(ii) $8 + 10 = 18$

From the above two examples we conclude that if we add two whole numbers, then the resulting number is also a whole number. Therefore,

> If a and b are whole numbers
> Then $a + b$ is a whole number

Property II: The sum of two whole numbers remains the same even if the order of the numbers is changed.

Illustrations: Observe that

(i) $9 + 15 = 24$

and $15 + 9 = 24$

$\therefore$ $9 + 15 = 15 + 9$

(ii) $15 + 7 = 22$

and $7 + 15 = 22$

$\therefore$ $15 + 7 = 7 + 15$

Hence the sum of two whole numbers remains the same even if the order of numbers [called addends] is changed.

Thus we have,

> If a and b are whole numbers, then
> $a + b = b + a$

Property III: The sum of three whole numbers is same even if they are added in different ways.

Illustrations:

Method I: $7 + 4 + 9 = (7 + 4) + 9 = 11 + 9 = 20$

Method: $7 + 4 + 9 = 7 + (4 + 9) = 7 + 13 = 20$

Thus $\therefore (7 + 4) + 9 = 7 + (4 + 9) = 7 + 4 + 9 = 20$

> If a, b, c are whole numbers, then
> $(a + b) + c = a (b + c) = a + b + c$

Illustrations:

(i) Find the sum of 123, 257 and 343 by suitable arrangement

Solution: $123 + 257 + 343 = 123 + (257 + 343)$
$= 123 + 600$
$= 723$

(ii) Add 23, 139, 277 and 361 by suitable arrangement.

Solution: $23 + 139 + 277 + 361 = 23 + 277 + 139 + 361$
$= (23 + 277) + (139 + 361)$
$= 300 + 500$
$= 800$

Note: In the above illustrations, the numbers are rearranged in such a way that the simplification is made easier.

Property IV: The sum of zero and a whole number is the whole number itself.

Illustrations:

(i) $0 + 8 = 8 = 8 + 0$

(ii) $0 + 0 = 0 = 0 + 0$

Therefore we conclude that the sum of zero and any whole number is the whole number itself. Thus we have

> If a is any whole number, then
> $A + 0 = a = 0 + a$

Note: Property IV is called the addition property of zero and zero (0) is called the identity element for addition (or additive identity).

EXERCISE 2.1

1. Fill in the blanks by making use of the appropriate property of addition in whole numbers:

(i) $794 + 1238 =$ ________ $+ 794 =$ _________

(ii) $14040 + 0 =$ _______

(iii) $444 + (1294 + 44) = (44 +$ ________ $) + 444.$

(iv) $a + 0 = a = 0 + a$

$a - 0 = a$

$a \times 0 = 0 = 0 \times a$

$0 \div a = 0$, when $a \neq 0$

$a \div 0$ does not exist.

(v) $a + (-a) = 0 = (-a) + a$

$a \div a = 1$, when $a \neq 0$

$a \div (-a) = -1 = (-a) \div a$, when $a \neq 0$

(vi) $a \times 1 = a = 1 \times a$; $a \times (-1) = -a = (-1) \times a$

(vii) $a \times (b + c) = a \times b + a \times c$

and $a \times (b - c) = a \times b - a \times c$

(viii) $a + 1$ is the successor of a and $a - 1$ is the predecessor of a

(ix) There is no smallest or largest integer.

13. In simplifying numerical expressions we carry out the operations according to the order D., M., A., S. If there are brackets (or grouping symbols), we first simplify the expression inside the brackets. If there are two or more different types of brackets in an expression, the innermost brackets are removed first.

14. $a \times a = a^2$; a^2 is called the exponential form or the index form. a is called the base and 2 is called the exponent or index.

15. $(-1)^{\text{odd integer}} = (-1)$; $(-1)^{\text{even integer}} = 1$.

5 ALGEBRAIC EXPRESSIONS

1. Introduction

Algebra is a branch of Mathematics dealing with relations and properties of numbers by means of letters and other general symbols. Algebra is often known as "Generalised Arithmetic" or "Symbolised Arithmetic". Algebra presents statements, instructions and results in a very concise form through the use of symbols. The word 'Algebra' is derived from the title of the book "ALJEBAR W' AL ALMUGABALAH" which was written in about A.D. 825 by the Arab Mathematician Mohammad Ibn Al Khowarizimi of Baghdad.

2. Use of letters to denote numbers

We are familiar with the formula $S = \frac{D}{T}$

This is a short way of expressing the statement "Speed is distance travelled in a unit of time". This formula is true for all values of D and T and for all systems of units. S, D and T represent numbers in the above formula.

We have also come across the formula

$$S.I. = \frac{P \times T = R}{100}$$

Here also we find that the letters, P, T and R are used to represent various values of Principal, Time and Rate respectively. This formula is also true for all values of P, T and R.

From the above two examples, we observe that we can use letters to represent numbers. This helps us to think in more general terms. Thousands of problems can be solved by using different values of the letters in the formula.

Letters which used to represent numbers are known as **literal numbers** or simply **literals**.

3. Basic operations on literal numbers and numbers

Literal Numbers as well as their combination with numbers obey all the rules and signs of addition, subtraction, multiplication and division of numbers along with the properties of these operations.