APPENDIX II

POST - TEST

Time :3 hours
Marks :100

N.B.: 1) All questions are compulsory.
2) Write answers of the questions in the space provided below the question.

1. Define the terms : (5)

(i) Systems :

(ii) Surrounding :

(iii) Internal energy :

(iv) Enthalpy :

(v) Coordinate bond :

2. (a) What do you mean by the internal energy of molecules ? (3)

(b) How will you determine it's absolute value ?

3. State whether each of the following conditions will increase OR decrease the total energy content of the system : (3)

(a) Work done by the system :

(b) Heat transferred to the surrounding :

(c) Work done on the system :

4. State and Explain briefly the Hess's law of constant heat summation. (3)

5. Explain the term Exothermic and Endothermic reactions giving examples in each case. (3)

Exothermic Reactions :

Endothermic Reactions :

6. (a) Define Enthalpy of neutralization ? (2)

(b) Reason out why enthalpy of neutralization of strong acid - strong base is constant ? (2)

7. What are Saturated and Unsaturated hydrocarbons give example of each. (2)

Saturated hydrocarbon :

Unsaturated hydrocarbon :

8. What are Primary, Secondary and Tertiary carbon atoms ? Explain giving example of each. (6)

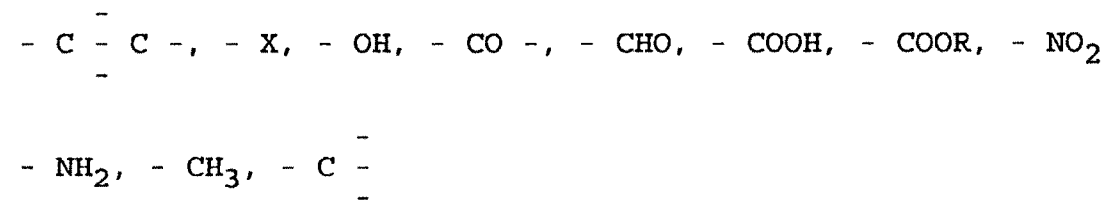
1^0 carbon atom :

2^0 carbon atom :

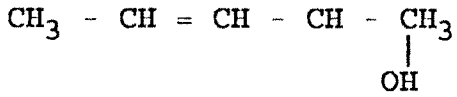
3^0 carbon atom :

9. Write the full expression of 'IUPAC' (1)

10. Write the given functional groups in decreasing order of reactivity. (3)



11. Give IUPAC Name for the following structural formulae : (4)

(1) 

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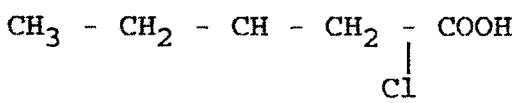
(2) 

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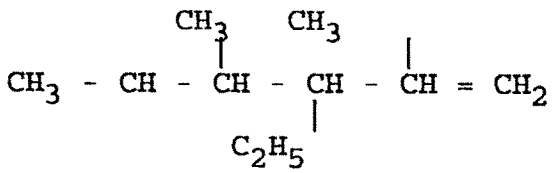
(3) 

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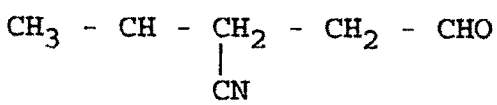
(4) 

12. Write structural formulas of the following compounds : (3)

(1) 2,5 - dimethyl - 3 - hexene

(2) 3 - Nitro - butanoic acid

(3) 1 - cyano - 4 - methyl pentane.

13. Draw the structures of possible isomers of the following compounds and show the type of isomerism existing in them.

(i) C_3H_6O
Structures of :
isomers

Type of isomerism :

(ii) C_4H_9 Br :
Structures of :
isomers

Type of isomerism :

(iii) C_6H_{14}
Structures of :
isomers

Types of isomerism :

14. What are optical isomers ? Give one example (3)

15. From the following given compounds select the compounds having chiral carbon atom and Draw the structures of enentiomers.

(a) CH_3 CHCL - CH_3
(b) CH_3 CHCL - COOH
(c) Br - CH_2CHCL CH_2Br
(d) CH_3 CHOH CH_2 CH_3

16. (a) State the conditions necessary for an organic compound to show geometric isomerism ? (4)

(b) Give the types of possible geometric isomers.

17. Give the elements which are likely to form ionic bond. (2)

(a) (c)

(b) (d)

18. Define octet rule ? Give valency of the following elements (6)

Octet Rule :

Oxygen O_8 Sodium Na_{11} Calcium Ca_{20}

Phosphorous P_{15}

19. Give three points of differences between covalent and ionic bond. (3)

	Covalent bond	Ionic bond
1.		
2.		
3.		

20. Draw Lewis electron dot structures for the following molecules. (5)

(i) NH_3 (ii) CO

(iii) BF_3 (iv) H_2S

(v) $SiCl_4$

21. Give Lewis electron dot diagram and indicate type of bonding between them. (4)

(i) Na_{11} and F_9

Lewis
Electron dot
Structures :

Sodium Fluorine

Type of bonding between sodium and Fluorine :

(i) NH_3 and H^+

Lewis
Electron dot
Structures :

NH_3 molecule H^+ proton

Type of bonding between NH_3 and H^+ :

22. Describe the formation of Hydrogen molecule on the basis of electrostatic interaction also give potential energy diagram. (5)

23. (a) What is meant by Hydrogen bond ? (4)

(b) How does it come into existence ?

(c) Show the existence of Hydrogen bond in the structure of NH_3 molecule.

24. Give Scientific Reasons : (8)

(a) Graphite is a good conductor of electricity while diamond is bad conductor.

(b) Ammonia has higher boiling point than phosphine (PH_3) although both belong to the same group.

(c) Ionic reactions are very fast

(d) He_2 molecule does not exist.

NUMERICALS

Answer any three (6)

1. Apply Hess's law to calculate the enthalpy of formation of SO_2 from the following thermochemical equations :

$$S(s) + 3/2\ O_2\ (g) \text{ -----> } SO_2 + X\ KJ$$

$$SO_2 + 1/2\ O_2\ (g) \text{ -----> } SO_3 + Y\ KJ$$

2. Calculate the enthalpy of combustion for NO from the following data :

$$1/2N_2(g) + 1/2O_2(g) \text{ -----> } NO(g) \quad H = +\ 90.7\ KJ$$

$$1/2N_2(g) + O_2(g) \text{ -----> } NO_2(g) \quad H = +\ 34.0\ KJ$$

3. (i) Calculate H for the reaction

CH_2CL_2 -----> C(g) + 2H(g) + 2Cl(g)

bond energies of

C-H, C-Cl bonds are 415.0 & 326.0 KJ/Mole

(ii) Calculate the amount of heat evolved when 39 gm of benzene is burnt. Given that .....

C_6H_6Cl + 1 1/2 O_2(g) -----> $3H_2O$(g) + $6CO_2$(g) :
H = -3264.6 KJ/Mole

4. For the reaction at 1300^oK

Si(s) + Sicl (g) -----> 2 $Sicl_2$(g)
H = 531 KJ
G = -5.837 KJ
calculate S ?

5. Calculate the energy change per mole for the following reaction.

$CaCo_3$ (s) -----> Cao(s) + CO_2(g) at 298^oK
H = 177.9 KJ
S = 160.4 JK

6. What would be the heat released when : an aqueous solution containing 0.5 mole of HNO_3 is mixed with an aqueous solution containing 0.3 mole of NaoH.