Subject: Chemistry **SET A** **F.M. : 75**
Time : 3:00 hrs. **P.M : 30**

GROUP 'A'

MULTIPLE CHOICE QUESTIONS **(1×11=11)**

1. The oxidation number of Zn in the compound Zn-Hg is
   a. 0 b. 1 c. 2 d. 3
2. The species which is not isoelectronic with OH^- ion is
   a. F b. O^{2-} c. F^- d. Ne
3. Which of the statements is not correct?
   a. Copper is an example of metallic solid
   b. Copper sulphate is an example of crystalline solid
   c. Calcium chloride is an efflorescent substance
   d. When a liquid is heated, its surface tension decreases
4. The mass of 5.6 Litre of gas at NTP is 11 g, the gas is
   a. O_2 b. F_2 c. C_3H_6 d. C_3H_8
5. A substance which sublimes readily is
   a. Bromine b. chlorine c. iodine d. fluorine
6. The isotope of hydrogen differs in
   a. atomic number b. number of electrons c. number of neutrons d. both a and b
7. Excess of chlorine reacts with ammonia to produce
   a. N_2& HCl b. N_2& NCl_3 c. NCl_3& HCl d. N_2& NH_4Cl
8. Metamerism is shown by
   a. Aldehydes b. ethers c. alcohols d. all of the above
9. Which of the following compounds is assigned the cetane number of 100?
   a. Iso-butane b. Benzene c. α-methylnaphthalene d. n-hexadecane
10. Which of the following statements is incorrect?
    a. Molecular mass of common salt is 57 amu
    b. Nitric acid is also called aqua fortis
    c. Molecular formula of sulphur is S_8
    d. Common name of methanoic acid is formic acid
11. An unknown gas (A) diffuses 4 times slower than hydrogen gas (H_2) at the same temp. and pressure. What will be the molecular mass of the gas (A)?
    a. 8 b. 28 c. 32 d. 64

GROUP B

SHORT QUESTIONS: (8×5=40)

1. What do you mean by oxidizing agents? Balance the following reaction; [1+4]

$$NaOH + Br_2 \longrightarrow Na\,Br + Na\,BrO_3 + H_2O$$

2. A. Calculate the oxidation number of underlined elements in the following compounds. [1+.5+.5]

(a) $\underline{Fe}_3O_4$ (b) $\underline{C}_6H_{12}O_6$ (c) $H_2\underline{S}O_4$

B. What is ECE? Calculate the quantity of electricity required to deposit 40 g of aluminium from molten Al_2O_3. [1+2]

3. Write the postulates of Bohr's atomic model. What are the applications and defects of this model? [3+2]

OR

Draw a well labelled diagram showing various spectral series of hydrogen spectrum. Describe hydrogen spectrum in light of Bohr's atomic theory. [5]

4. The organic compound A which was first synthesized in the laboratory from an inorganic source, has 60 molar mass and shows the Lassaigne's test with Prussian blue colour. What will be compound A, write all the involved reactions to show how Prussian blue colour was formed? [1+4]

5. Write short note on; [1.5+1.5+2]

(a) Octane number
b. Tetra-covalency of carbon
c. Inductive effect

6. Draw a flow sheet diagram for manufacture of ammonia by Haber's process. Also write the basic principle involved to manufacture it. [2+3]

7. What happens when; [5]

a. HI is treated with copper sulphate solution.
b. Gas obtained by heating NaCl with conc. H_2SO_4 and MnO_2 is passed through
   i. Dilute solution of NaOH
   ii. Hot and conc. Solution of NaOH
c. Sodium nitrite is added to chlorine water
d. Cl_2 is treated with CO

8. Define ionization potential. What are the factors that influences the magnitude of ionization energy? Explain the general trends of variation of ionization energy in the periodic table. [1+3+1]

GROUP C

LONG QUESTIONS: (3×8=24)

1. Sulphuric acid is one of the largest volumes of industrial chemical produced in the world. Over the last decades the contact process has been used to produce sulphuric acid, replacing the traditional (Lead Chamber) process.
   a. Write the four steps of chemical equation for the manufacturing of sulphuric acid by contact process stating from iron sulphide. [4]
   b. Give any two chemical reactions in which sulphuric acid acts as precipitant and dehydration agent. [2]
   c. What happens when conc. Sulphuric acid added to [2]
      i. Sucrose ii. Blue vitriol
2. **A.** Derive the ideal gas equation PV=nRT where the symbols have their usual meaning. State two conditions under which behaviour of real gas approaches that of an ideal gas. [3+2]

   B. A spherical balloon of 21 cm diameter is to be filled with hydrogen gas at NTP from a cylinder containing gas at 20 atm and 27°C. If the cylinder can hold 2.82 litres of water vapour at NTP, calculate the number of balloon that can be filled up. [3]
3. **A.** How does metamerism differs from positional isomerism? Give two examples of each. Write the 4 differences between homolytic and heterolytic bond fission. [2+2]

   B. Write the structure of following compounds: [4]
   a. 2-Ethoxybutane
   b. 2-Methylbutanal
   c. methanoic acid
   d. Benzene

Good Luck