

**MODEL QUESTION PAPER FOR SUMMATIVE ASSESSMENT**  
**CHEMISTRY**

Time: 3 Hours

Max Marks: 70

**INSTRUCTIONS:**

- i) The question paper has five parts A.B.C.D and E. All the parts are compulsory.
- ii) Write balanced chemical equations and draw labeled diagrams wherever asked.
- iii) Use log tables and simple calculators if necessary.  
(Use of scientific calculators is not allowed)

**PART-A**

**Answer any NINE questions.**

**(Answer each question in one word or in one sentence) 9 x 1 =9**

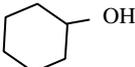
1. State 'Law of definite Proportions'.
2. Name the fundamental particle of an atom that has highest value for its  $e/m$ .
3. Write the two resonance (canonical/contributing) structures of Ozone.
4. A molecule  $XY_4$  has four bond pairs and 2 lone pairs of electrons for its central atom. Predict the shape of the molecule.
5. How many valence electrons are present around Phosphorous in  $PCl_5$ ?
6. What is the change in Internal energy of a system, if 10 J of heat is supplied to it and 15 J of work is done by it?
7.  $H^-$  is a Lewis base. Give reason.
8. What is the composition of Water gas?
9. Which alkali metal is the strongest reducing agent?
10. Draw the staggered conformation of Ethane.
11. Mention one use of Chromatography.

**PART – B**

**Answer any FIVE questions (Each question carries two marks) 5x2=10**

12.
  - i) How many significant figures are in 0.2500 g?
  - ii) If the mass of one molecule of water is 18 amu, what is the mass of one mole of water molecules?
13.
  - i) How does the atomic radius vary down a group in the periodic table?
  - ii) Arrange the following in the decreasing order of their ionic radius:  
 $N^{-3}$ ,  $Mg^{+2}$ ,  $Na^{+1}$ ,  $O^{-2}$



23. a) How is Sulphur detected using the 'Sodium fusion extract' of the given organic compound?
- b) Give the IUPAC name of  Write the bond line diagram of 2-methyl pentane. 2+2
24. a) Give equations for each of the following Reactions.
- Water is dropped on Calcium carbide
  - Hydrogen bromide is added to Propene in presence of peroxide.
  - Phenol is heated with Zinc dust.
  - Benzene is treated with Chlorine in presence of Ferric chloride. 4

**OR (Internal choice)**

- b) i) Write the equations for the steps involved in the mechanism of nitration of Benzene.  
Between Toluene and Nitrobenzene which one is more reactive towards Nitration? 4

**PART-D**

**Answer any FOUR questions. (Each question carries five marks) 4x5=20**

25. a) Calculate the mass of Magnesium required to completely react with 250 cm<sup>3</sup> of 0.1M HCl  
Given:  $\text{Mg} + 2\text{HCl} \longrightarrow \text{MgCl}_2 + \text{H}_2$   
Atomic mass of Mg = 24
- OR (Internal choice)**
- 100 cm<sup>3</sup> of a solution of HCl completely neutralizes 25 cm<sup>3</sup> of 0.1 M NaOH. Calculate the mass of HCl present in 100 cm<sup>3</sup>.
- b) Mention two postulates of 'Dalton's Atomic theory' 3+2
- OR (Internal choice)**
- What is Empirical formula? Give an example for a compound whose Empirical formula and molecular formula are the same. 3+2
26. a) Define the terms:  
i) Bond order ii) Bond length iii) Bond enthalpy
- b) With respect to the formation of Ethane molecule mention:  
i) hybridisation of Carbon. 3+2  
ii) number of sigma bonds in the molecule

27. a) Write three postulates of 'Kinetic theory of gases'.  
 b) Two gases A & B have critical temperatures as 250 K and 125 K respectively. Which one of these can be liquefied easily and why? 3+2
28. a) Calculate the pOH of a solution obtained when 0.05 mol NH<sub>4</sub>Cl is added and dissolved in 0.025M Ammonia solution. K<sub>b</sub> for Ammonia is 1.77 x 10<sup>-5</sup>  
 b) For the equilibrium: 
$$\text{BaCO}_3 \rightleftharpoons \text{BaO} + \text{CO}_2$$
(s) (s) (g)  
 i) Write the expression for K<sub>p</sub>  
 ii) What is the effect of 'increase in pressure' on the above equilibrium? 3+2
29. a) Give reasons  
 i) Coordination number of Be is 4, but that of Mg is six.  
 ii) Lithium iodide is covalent but Potassium iodide is ionic.  
 b) Compare the 2<sup>nd</sup> Ionisation enthalpies and Hydration enthalpies of Alkali and Alkaline earth metals/ions.  
 c) What is the chemical formula of Plaster of Paris? 2+2+1
30. a) Name the method by which Halogen present in an organic compound is estimated?  
 0.1 g of an organic compound gives 0.08g of Silver bromide.  
 Calculate the percentage of Bromine in the organic compound.  
 Atomic masses: Ag = 108, Br = 80  
 b) What is Inductive effect?  
 Which one of the following shows maximum hyper conjugation effect?  
 CH<sub>3</sub>CH = CH<sub>2</sub>      (CH<sub>3</sub>)<sub>2</sub>C = CH<sub>2</sub>      CH<sub>2</sub> = CH<sub>2</sub> 3+2

## PART-E

Answer any **THREE** Questions (Each question carries five marks) **3x5=15**

31. a) For the Element with atomic number 24:
- Write the electronic configuration
  - Write the value of  $n$  &  $l$  for its electron in the valence shell.
  - How many unpaired electrons are present in it?
- b) What is Photo electric effect? Does the effect support particle nature or wave nature of light? 3+2
32. a) What is a Spontaneous process?  
For the equilibrium  $A + 2B \rightleftharpoons C$   
 $\Delta H$  is  $+400 \text{ kJ}$  and  $\Delta S$  is  $+200 \text{ JK}^{-1}$ .  
Calculate the temperature above which the reaction becomes spontaneous?
- b) For  $\text{Cl}_2 \longrightarrow 2\text{Cl}$   
 $(g) \qquad \qquad (g)$   
Assign the signs for  $\Delta H$  and  $\Delta S$ . 3+2
33. a) Calculate the solubility of  $\text{Ag}_2\text{CrO}_4$  in  $0.1\text{M AgNO}_3$   
 $K_{sp}$  of  $\text{Ag}_2\text{CrO}_4 = 1 \times 10^{-12}$
- b) An aqueous solution of sodium acetate has pH greater than 7.  
Explain with equation. 3+2
34. a) Give reasons:
- The stability of +3 oxidation state of 13 group elements decreases down the group
  - Boron is used as control rods in nuclear reactors
  - Graphite is soft and slippery
- b) Complete the following equations:
- $2 \text{ Al} + 2 \text{ NaOH} + \longrightarrow 6\text{H}_2\text{O} \dots\dots\dots + \dots\dots$
  - $\text{B}_2\text{H}_6 + 3\text{O}_2 \xrightarrow{\text{Burn}} \dots\dots\dots + \dots\dots\dots$  3+2
35. a) Give two tests to distinguish between Alkanes and Alkenes.
- b) Naphthalene is an aromatic compound  
Justify the statement using Huckel rule.
- c) Draw cis and trans structures of  $\text{CHBr} = \text{CHBr}$  2+2+1