

**CBSE Board**  
**Class XII Chemistry**  
**Sample Paper - 12**

Time: 3 Hrs

Total Marks: 70

1. All questions are compulsory.
2. Question nos. **1 to 8** are very short answer questions and carry 1 mark each
3. Question nos. **9 to 18** are short answer questions and carry 2 marks each.  
Use of calculator is not permitted.
4. Question nos. **19 to 27** are also short answer questions and carry 3 marks each
5. Question nos. **28 to 30** are long answer questions and carry 5 marks each
6. Use log tables if necessary, use of calculators is not allowed.

- Q.1** For the reaction  $A + B \rightarrow P$ , doubling the concentration of reactant B has no effect on the overall rate of reaction. What is the order of the reaction with respect to the reactant B?
- Q.2** Indicate whether the oxidation of sulphur dioxide into sulphur trioxide with oxygen gas in the presence of nitric oxide gas in a lead-lined flask is a homogeneous or a heterogeneous catalysis. Why is it so?
- Q.3** State the oxidation states of chlorine and iodine atoms, respectively, in  $\text{ClO}_4^-$  ion and  $\text{IF}_7$ .
- Q.4** Give the state of hybridisation of nickel atoms in the following complexes:  
 (i) Diamagnetic tetracarbonylnickel (0)  
 (ii)  $[\text{NiCl}_6]^{4-}$  ion
- Q.5** Write the structure of DDT.
- Q.6** Write the names of benzene-ring containing structural isomers that can be written for the molecular formula  $\text{C}_7\text{H}_8\text{O}$ .
- Q.7** Write IUPAC names of the compounds (i)  $(\text{CH}_3)_2\text{C}=\text{CHCOCH}_3$  and (ii)  $\text{HCOCl}$ .
- Q.8** Write the names of monosaccharides making up the molecules of:  
 (i) lactose and (ii) sucrose.
- Q.9** Atoms of element B form *hcp* lattice and those of the element A occupy  $2/3^{\text{rd}}$  of tetrahedral voids. What is the formula of the compound formed by the elements A and B?

**Q.10** In fcc arrangement, the corner atoms are of M type and those at the face centres are Z type. What is the empirical formula of the compound?

**Q 11.**

- (a) Define Kohlrausch Law.
- (b) The limiting molar conductivities of the cation and anion of univalent electrolyte MX were found to be 120 and 34.5 unit respectively. Calculate the limiting molar conductivity of the solution.

**Q.12**

- (a) For the reaction  $2A \rightarrow P$ , the concentration of reactant changes from 0.06 molar to 0.04 molar in first 20 minutes, and then to 0.02 molar in the next 20 minutes. What is the average rate of the reaction?
- (b) State the order and molecularity of the above stated reaction.

OR

Calculate the half-life period of a first order reaction when the rate constant is 5 year<sup>-1</sup>.

**Q.13**

- (a) Write the units of rate constant for zero order and first order reactions.
- (b) What is the effect of temperature on the rate constant of a reaction? How can this temperature effect on rate constant be represented quantitatively?

**Q. 14**

- (a) State the decreasing order of acidity of mineral acids, HI, HBr and HF giving reasons.
- (b) Give the difference in the electrical polarity of CO<sub>2</sub> and SO<sub>2</sub> gases. State the reason.

**Q.15** Explain the following:

- (a) H<sub>3</sub>PO<sub>2</sub> and H<sub>3</sub>PO<sub>3</sub> act as good reducing agents while H<sub>3</sub>PO<sub>4</sub> does not.
- (b) Predict the shape of ClF<sub>3</sub> on the basis of VSEPR theory.

**Q.16**

- (a) Write the name of the type of isomerism shown by Au-NCS and Au-SCN molecules.

(b) Write IUPAC name of  $[\text{Co}(\text{H}_2\text{NCH}_2\text{CH}_2\text{NH}_2)_3]_2(\text{SO}_4)_3$ .

(c) Account for the observation that aqueous Ti(III) salt is coloured but Sc(III) salt is colourless.

**Q.17**

(a) Write the name of the distinguishing test in which a solution of a primary amine in chloroform on being heated with aqueous NaOH gives an offensive odour. Write a chemical equation for the test.

(b) Indicate the sequence of conversions starting from aniline to fluorobenzene.

**Q.18** Out of the following, which compound is less basic in each case? Give reason.

(i) Aniline or 4-nitroaniline;

(ii) Aminoethane or ethanamide;

**Q.19**

(a) What is the cell reaction and the cell emf at 298K of the cell diagrammed below?



$$\text{Given } E^\circ_{(\text{Zn}^{2+}/\text{Zn})} = -0.762\text{V and } E^\circ_{(\text{Pb}^{2+}/\text{Pb})} = -0.126\text{V}$$

(b) Write any two factors does the electrode potential depend?

**Q.20**

(a) What are lyophobic colloids?

(b) Describe two methods for purification of sols and colloidal solutions.

Or

(a) Explain the following:

(i) Tyndall effect

(ii) Coagulation

(iii) Electrophoresis

**Q.21** In the process of froth floatation, collectors (pine oil) and depressants (NaCN) are used for different purposes. Explain the use of depressants technically and economically beneficial for us. Write any one value related with it.

**Q.22**

- Give one method of preparation of chlorine gas and write the balanced equation.
- What happens when ammonia gas is allowed to react with an excess of chlorine gas?
- How is bleaching powder prepared?

**Q.23** Identify compounds A, B, C and D in the following scheme of conversions m Bromocyclohexane,  $C_6H_{11}Br$ , was first treated with Mg in dry ether whereupon was formed. When water was added to the reaction mixture containing A, compound B was formed. Boiling compound B with HBr gave compound C. When C was treated with  $C_2H_5ONa$  in dry ethanol, D was formed. Write the reactions.

**Q.24**

- Why is phenol less acidic than 2-fluorophenol? Explain.
- Suggest a simple physical method for the separation of 2-nitrophenol from 4-nitrophenol.

**Q.25**

- Write the names and molecular formula of sugar unit present in DNA and cellulose.
- In what way cellulose is different from amylose starch?

**Q.26**

- Give two points to distinguish between homopolymer and copolymer.
- Write the names and formula of the monomers of (i) nylon-6; (ii) natural rubber?

**Q.27**

- Define antacids. Give one example.
- Name two widely used antibiotics.
- Define broad spectrum antibiotics.

**Q.28**

- Define colligative property
- Name one scientific process which is employed for the desalination of sea-water.

- (c) The boiling point of benzene is 353.23K at normal pressure. The boiling point of a solution of benzene containing 1.80 g of a non-volatile substance of molar mass 58 g /mol, per 90 g of solvent was found to be 354.11K. Calculate the molal elevation constant for benzene.

OR

- (a) Give two characteristics of ideal solutions.  
 (b) Calculate the boiling point of an aqueous solution of 9 g of glucose per 2000 g of water. Given the  $K_b(\text{H}_2\text{O}) = 0.52 \text{ K kg /mol}$ .

**Q 29.**

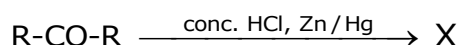
- (a) What is lanthanoid contraction? What are the consequences of lanthanoid contraction?  
 (b) Actinoid contraction is greater from element to element than lanthanoid contraction. Why?  
 (c) Why is  $\text{K}_2\text{Cr}_2\text{O}_7$  preferred over  $\text{Na}_2\text{Cr}_2\text{O}_7$  as an oxidizing agent?  
 (d) Why do the transition elements exhibit higher enthalpies of atomisation?

OR

- (a) Explain  
     (i) Why Cr is a hard metal whereas Zn is soft.  
     (ii) Mn possesses various oxidation states. Give the reason to explain it.  
     (iii) Mn (VII) has no d-electrons for d-d transition. Yet it has a purple colour. Explain.  
 (b) Name a member of the lanthanoid series which is well known to exhibit +4 oxidation state. Give its electronic configuration also.  
 (c) Transition and inner transition elements show catalytic activity?

**Q 30.**

- (a) Acetaldehyde is more reactive than benzaldehyde towards Fehling's solution. Explain.  
 (b) Give the product in the following reaction



Name the reaction.

(c) Give reaction for the following conversions:

- (i) Benzaldehyde to benzoic acid.
- (ii) Benzene to benzaldehyde.
- (iii) Propanone to 2-propanol.

**OR**

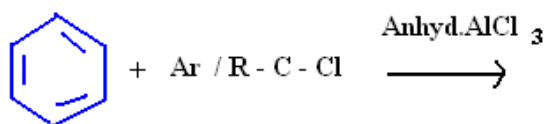
(a) Give one reaction to distinguish ethanal and propanal.

(b) Carry out the following conversions:

- (i) Acetaldehyde to ethanol.
- (ii) Acetone to 2-methyl-2-propanol.

(c) Write the products of the following reaction:

(i)



(ii)

