

CBSE Class 12 Chemistry 2009 - Set 56/1 (Outside Delhi)



Question Paper

Conducted by the Central Board of Secondary Education (CBSE)

Time Allowed: 3 Hours

Maximum Marks: 70

General Instructions

- (i) This question paper contains 30 questions. All questions are compulsory.
- (ii) Marks for each question are indicated against it.
- (iii) Questions 1 to 8 are very short-answer questions carrying 1 mark each.
- (iv) Questions 9 to 18 are short-answer questions carrying 2 marks each.
- (v) Questions 19 to 27 are also short-answer questions carrying 3 marks each.
- (vi) Questions 28 to 30 are long-answer questions carrying 5 marks each.
- (vii) Use log tables, if necessary. Use of calculators is not allowed.

Questions

1. How do metallic and ionic substances differ in conducting electricity?

2. What is the 'coagulation' process?

3. What is meant by the term 'pyrometallurgy'?

4. Why is red phosphorus less reactive than white phosphorus?

5. Give the IUPAC name of the following compound:



6. Write the structural formula of 1-phenylpentan-1-one.

7. Arrange the following compounds in an increasing order of basic strengths in their aqueous solutions:

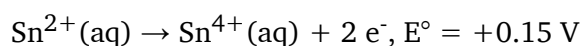
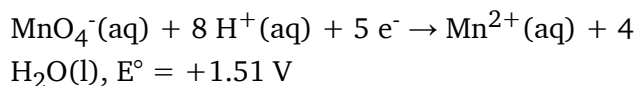


8. What does '6,6' indicate in the name nylon-6,6?

9. What type of cell is a lead storage battery? Write the anode and the cathode reactions and the overall cell reaction occurring in the use of a lead storage battery.

OR

9. Two half cell reactions of an electrochemical cell are given below:



Construct the redox equation from the two half cell reactions and predict if this reaction favours formation of reactants or product shown in the equation.

10. Define the following:

(i) Elementary step in a reaction

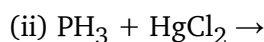
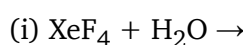
(ii) Rate of a reaction

11. Describe the underlying principle of each of the following metal refining methods:

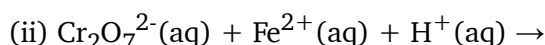
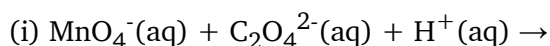
(i) Electrolytic refining of metals

(ii) Vapour phase refining of metals

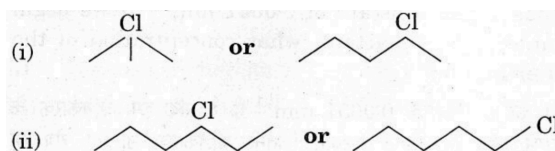
12. Complete the following chemical reaction equations:



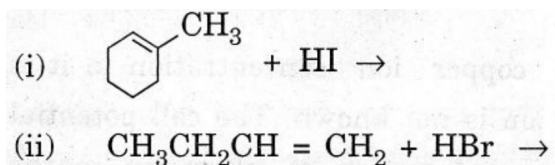
13. Complete the following chemical reaction equations:



14. Which one in the following pairs undergoes $\text{S}_{\text{N}}1$ substitution reaction faster and why?



15. Complete the following reaction equations:



16. Name the four bases present in DNA. Which one of these is not present in RNA?

17. Name two fat soluble vitamins, their sources and the diseases caused due to their deficiency in diet.

18. Differentiate between molecular structures and behaviours of thermoplastic and thermosetting polymers. Give one example of each type.

19. A first order reaction has a rate constant of 0.0051 min^{-1} . If we begin with 0.10 M concentration of the reactant, what concentration of the reactant will be left after 3 hours?

20. Silver crystallises with face-centred cubic unit cells. Each side of the unit cell has a length of 409 pm. What is the radius of an atom of silver? (Assume that each face atom is touching the four corner atoms.)

21. A copper-silver cell is set up. The copper ion concentration in it is 0.10 M. The concentration of silver ion is not known. The cell potential measured 0.422 V. Determine the concentration of silver ion in the cell.

Given: $E^\circ_{\text{Ag}^+/\text{Ag}} = +0.80 \text{ V}$, $E^\circ_{\text{Cu}^{2+}/\text{Cu}} = +0.34 \text{ V}$.

22. What happens in the following activities and why?

(i) An electrolyte is added to a hydrated ferric oxide sol in water.

(ii) A beam of light is passed through a colloidal solution.

(iii) An electric current is passed through a colloidal solution.

23. Giving a suitable example for each, explain the following:

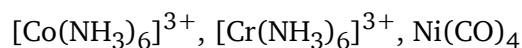
(i) Crystal field splitting

(ii) Linkage isomerism

(iii) Ambidentate ligand

OR

23. Compare the following complexes with respect to structural shapes of units, magnetic behaviour and hybrid orbitals involved in units:



(At. Nos.: Co = 27, Cr = 24, Ni = 28)

24. Explain the following observations:

(i) The boiling point of ethanol is higher than that of methoxymethane.

(ii) Phenol is more acidic than ethanol.

(iii) o- and p-nitrophenols are more acidic than phenol.

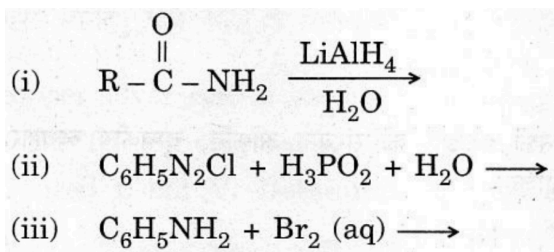
25. How would you account for the following:

(i) Many of the transition elements and their compounds can act as good catalysts.

(ii) The metallic radii of the third (5d) series of transition elements are virtually the same as those of the corresponding members of the second series.

(iii) There is a greater range of oxidation states among the actinoids than among the lanthanoids.

26. Complete the following reaction equations:



27. Describe the following substances with one suitable example of each type:

- (i) Non-ionic detergents
- (ii) Food preservatives
- (iii) Disinfectants

28. (a) Define the following terms:

- (i) Mole fraction
 - (ii) Van't Hoff factor
- (b) 100 mg of a protein is dissolved in enough water to make 10.0 mL of a solution. If this solution has an osmotic pressure of 13.3 mm Hg at 25°C, what is the molar mass of protein?
- (R = 0.0821 L atm mol⁻¹ K⁻¹ and 760 mm Hg = 1 atm.)

OR

28. (a) What is meant by:

- (i) Colligative properties
 - (ii) Molality of a solution
- (b) What concentration of nitrogen should be present in a glass of water at room temperature? Assume a temperature of 25°C, a total pressure of 1 atmosphere and mole fraction of nitrogen in air of 0.78. [K_H for nitrogen = 8.42×10^{-7} M/mm Hg]

29. (a) Draw the structures of the following:

- (i) $H_2S_2O_8$
 - (ii) $HClO_4$
- (b) How would you account for the following:
- (i) NH_3 is a stronger base than PH_3 .
 - (ii) Sulphur has a greater tendency for catenation than oxygen.
 - (iii) F_2 is a stronger oxidising agent than Cl_2 .

OR

29. (a) Draw the structures of the following:

- (i) $H_2S_2O_7$
 - (ii) $HClO_3$
- (b) Explain the following observations:
- (i) In the structure of HNO_3 , the N–O bond (121 pm) is shorter than the N–OH bond (140 pm).
 - (ii) All the P–Cl bonds in PCl_5 are not equivalent.
 - (iii) ICl is more reactive than I_2 .

30. (a) Write chemical equations to illustrate the following name bearing reactions:

- (i) Cannizzaro's reaction
 - (ii) Hell-Volhard-Zelinsky reaction
- (b) Give chemical tests to distinguish between the following pairs of compounds:
- (i) Propanal and Propanone
 - (ii) Acetophenone and Benzophenone
 - (iii) Phenol and Benzoic acid

OR

30. (a) How will you bring about the following conversions:

- (i) Ethanol to 3-hydroxybutanal
 - (ii) Benzaldehyde to Benzophenone
- (b) An organic compound A has the molecular formula $C_8H_{16}O_2$. It gets hydrolysed with dilute sulphuric acid and gives a carboxylic acid B and an alcohol C. Oxidation of C with chromic acid also produced B. C on dehydration reaction gives but-1-ene. Write equations for the reactions involved.

- End of Question Paper -