

CBSE Class 12 Chemistry 2014 - Set 56/3 - Compartment



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) All questions are compulsory.
- (iii) Questions number 1 to 8 are very short-answer questions and carry 1 mark each.
- (iv) Questions number 9 to 18 are short-answer questions and carry 2 marks each.
- (v) Questions number 19 to 27 are also short-answer questions and carry 3 marks each.
- (vi) Questions number 28 to 30 are long-answer questions and carry 5 marks each.
- (vii) Use Log Tables, if necessary. Use of calculators is not allowed.

Questions

1. Write a distinguishing feature of a metallic solid compared to an ionic solid.

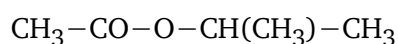
2. What are enzymes?

3. Name the chief ores of aluminium and zinc.

4. Draw the structure of PCl_5 (s) molecule.

5. Give a test to distinguish between propan-2-one and pentan-3-one.

6. Name the alcohol that is used to make the following ester:



7. Define a 'Peptide linkage'.

8. How does a homopolymer differ from a copolymer?

9. Set up Nernst equation for the standard dry cell. Using this equation show that the voltage of a dry cell has to decrease with use.

10. A reaction is of second order with respect to its reactant. How will its reaction rate be affected if the concentration of the reactant is

(i) doubled

(ii) reduced to half?

11(a). Describe the underlying principle of each of the following processes:

(i) Recovery of silver from the solution obtained by leaching silver ore with a solution of NaCN

(ii) Electrolytic refining of a crude metal

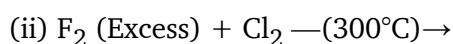
OR

11(b). Describe the principle involved in each of the following processes:

(i) Zone refining of a metal

(ii) Vapour phase refining of metals

12. Complete the following chemical equations:



13. Assign reasons for the following:

(i) Transition metals and many of their compounds act as good catalysts.

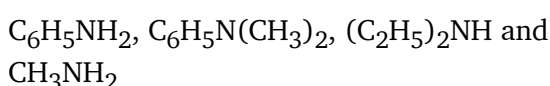
(ii) Transition metals generally form coloured compounds.

14. Write the structures of the following organic halogen compounds:

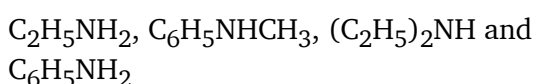
(i) p-Bromochlorobenzene

(ii) 1-Chloro-4-ethylcyclohexane

15. (i) Arrange the following compounds in an increasing order of basic strength:



(ii) Arrange the following compounds in a decreasing order of pK_b values:



16. What are ambident nucleophiles? Explain with an example.

17. Write the names and structures of monomers used for getting the following polymers:

(i) Buna-S

(ii) Nylon-6, 6

18. Give a chemical test to distinguish between each of the following pairs of compounds:

(i) Ethylamine and Aniline

(ii) Aniline and Benzylamine

19. Iron has a body centred cubic unit cell with a cell dimension of 286.65 pm. The density of iron is 7.874 g cm^{-3} . Use this information to calculate Avogadro's number (Gram atomic mass of Fe = 55.84 g mol^{-1}).

20. For a decomposition reaction, the values of k at two different temperatures are given below:

$$k_1 = 2.15 \times 10^{-8} \text{ L/(mol.s) at } 650 \text{ K}$$

$$k_2 = 2.39 \times 10^{-7} \text{ L/(mol.s) at } 700 \text{ K}$$

Calculate the value of E_a for the reaction.

$$(\text{Log } 11.11 = 1.046) \quad (R = 8.314 \text{ J K}^{-1} \text{ mol}^{-1})$$

21. The resistance of 0.01 M NaCl solution at 25°C is 200Ω . The cell constant of the conductivity cell used is unity. Calculate the molar conductivity of the solution.

22. Give reasons for the following:

(i) Transition metals exhibit a wide range of oxidation states.

(ii) Cobalt(II) is very stable in aqueous solutions but gets easily oxidised in the presence of strong ligands.

(iii) Actinoids exhibit a greater range of oxidation states than lanthanoids.

23(a). Giving appropriate examples, explain how the two types of processes of adsorption (physisorption and chemisorption) are influenced by the prevailing temperature, the surface area of adsorbent and the activation energy of the process?

OR

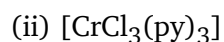
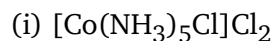
23(b). Explain clearly how the phenomenon of adsorption finds application in

(i) production of vacuum in a vessel

(ii) heterogeneous catalysis

(iii) froth floatation process in metallurgy

24. Write down the IUPAC names of the following complexes and also give stereochemistry and magnetic moment of the complexes:



(At. Nos. Cr = 24, Mn = 25, Co = 27, py = pyridine)

25. How are the following conversions carried out?

(i) Propene to Propan-2-ol

(ii) Ethylmagnesium chloride to Propan-1-ol

(iii) Benzyl chloride to Benzyl alcohol

26. What are essential and non-essential amino acids? Give two examples of each.

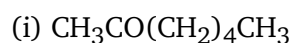
27. Answer the following:

(i) Why is the use of aspartame limited to cold foods and drinks?

(ii) How do antiseptics differ from disinfectants?

(iii) Why do soaps not work in hard water?

28(a). Write the IUPAC names of the following compounds:



28(b). Describe the following conversions in not more than two steps:

(i) Ethanol to 3-Hydroxybutanal

(ii) Benzoic acid to m-Nitrobenzyl alcohol

(iii) Propanone to Propene

OR

28(a). Draw the structures of the following compounds:

- (i) 4-Chloropentan-2-one
- (ii) p-Nitropropiophenone

OR

28(b). Give tests to distinguish between the following pairs of compounds:

- (i) Ethanal and Propanal
- (ii) Phenol and Benzoic acid
- (iii) Benzaldehyde and Acetophenone

29(a). What is van't Hoff factor? What types of values can it have if in forming the solution the solute molecules undergo

- (i) Dissociation?
- (ii) Association?

29(b). How many mL of a 0.1 M HCl solution are required to react completely with 1 g of a mixture of Na_2CO_3 and NaHCO_3 containing equimolar amounts of both? (Molar mass: $\text{Na}_2\text{CO}_3 = 106$ g, $\text{NaHCO}_3 = 84$ g)

OR

29(a). Define

- (i) Mole fraction
- (ii) Molality
- (iii) Raoult's law

OR

29(b). Assuming complete dissociation, calculate the expected freezing point of a solution prepared by dissolving 6.00 g of Glauber's salt, $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$ in 0.100 kg of water. (K_f for water = $1.86 \text{ K kg mol}^{-1}$, Atomic masses: Na = 23, S = 32, O = 16, H = 1)

30(a). Write the formula and describe the structure of a noble gas species which is isostructural with

- (i) IBr_2^-
- (ii) BrO_3^-

30(b). Assign reasons for the following:

- (i) SF_6 is kinetically inert.
- (ii) NF_3 is an exothermic compound whereas NCl_3 is not.
- (iii) HCl is a stronger acid than HF though fluorine is more electronegative than chlorine.

OR

30(a). How is ammonia prepared on a large scale? Name the process and mention the optimum conditions for the production of ammonia by this process.

OR

30(b). Assign reasons for the following:

- (i) H_2S is more acidic than H_2O .
- (ii) NH_3 is more basic than PH_3 .
- (iii) Sulphur has a greater tendency for catenation than oxygen.

- End of Question Paper -