

CBSE Class 12 Chemistry 2004 - Set 56/1 (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 27 questions. All questions are compulsory.
- (ii) Marks for each question are indicated against it.
- (iii) Questions 1 to 5 are very short-answer questions carrying 1 mark each. Answer in one word or about one sentence each.
- (iv) Questions 6 to 12 are short-answer questions carrying 2 marks each. Answer in about 30 words each.
- (v) Questions 13 to 24 are short-answer questions carrying 3 marks each. Answer in about 40 words each.
- (vi) Questions 25 to 27 are long-answer questions carrying 5 marks each. Answer in about 70 words each.
- (vii) Use log tables, if necessary. Use of calculators is not permitted.

Questions

1. Name a substance which on addition to AgCl causes cation vacancy in it.
2. Mention a large scale use of the phenomenon called 'reverse osmosis'.
3. Give an example of a pseudo first order reaction.
4. Write the IUPAC name of the following:
 $(\text{CH}_3)_2\text{C}=\text{CHCOCH}_3$
5. Mention two properties of acetonitrile by which it acts as a good solvent.
6. Draw a diagram showing the formation of bonding and antibonding molecular orbitals by the LCAO in homonuclear hydrogen molecule.
7. Taking a specific example show that ΔS_{total} is a criterion for spontaneity of a change.
8. Write the cell reactions which occur in lead storage battery (i) when the battery is in use (ii) when the battery is on charging.
9. Give chemical reaction in support of each of the following statements:
(i) The +1 oxidation state gets stabilised progressively from Ga to Tl in Group 13.
(ii) All the bonds in PCl_5 are not equivalent.

10. Explain the following terms:

- (a) Asymmetric molecule
- (b) R and S notations

11. Write the names of the reagents and equations in the conversion of

- (a) phenol to salicylaldehyde
- (b) anisole to p-methoxyacetophenone

12. Write the modes of free radical polymerization of an alkene.

OR

12. Differentiate between addition and condensation polymers based on mode of polymerization. Give one example of each type.

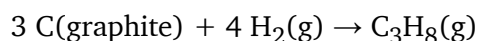
13. What information is given by (i) Radial probability density, R^2 and (ii) Radial probability function, $4\pi r^2 R^2$ in hydrogen atom? How do they vary with r for 1s orbital of hydrogen atom? Show diagrammatically.

14. Calculate the density of silver which crystallizes in the face-centred cubic structure. The distance between the nearest silver atoms in this structure is 287 pm.

(Molar mass of Ag = $107.87 \text{ g mol}^{-1}$, $N_A = 6.02 \times 10^{23} \text{ mol}^{-1}$)

15. Two elements A and B form compounds having molecular formulae AB_2 and AB_4 . Dissolved in 20 g of benzene, 1 g of AB_2 lowers the freezing point by 2.3 K, whereas 1 g of AB_4 lowers it by 1.3 K. The molar depression constant for benzene is $5.1 \text{ K kg mol}^{-1}$. Calculate the atomic masses of A and B.

16. Calculate the standard Gibbs energy change for the formation of propane at 298 K.



(Standard Gibbs energy values to be used as supplied in the question paper.)

17. Conductivity of 0.00241 M acetic acid is $7.896 \times 10^{-5} \text{ S cm}^{-1}$. Calculate its molar conductivity. If Λ_m° for acetic acid is $390.5 \text{ S cm}^2 \text{ mol}^{-1}$, what is its dissociation constant?

18. A reaction is first order in A and second order in B.

(a) Write differential rate equation.

(b) How is the rate affected if the concentration of B is tripled?

(c) How is the rate affected when the concentrations of both A and B are doubled?

What is the significance of rate constant in the rate expression?

19. How are the colloids classified on the basis of the nature of interaction between dispersed phase and dispersion medium? Describe an important characteristic of each class. Which of these sols need stabilising agents for preservation?

OR

19. What are detergents? Give their scheme of classification. Why are the detergents preferred over soaps?

20. Draw a figure to show splitting of degenerate d orbitals in an octahedral crystal field. How does the magnitude of Δ_o decide the actual configuration of d orbitals in a complex entity?

21. Write the nuclear reactions for the following radioactive decay:

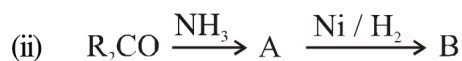
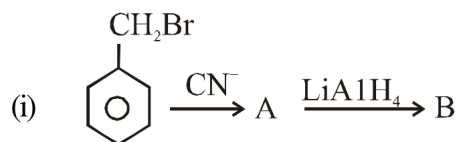
(i) ${}_{92}^{238}\text{U}$ undergoes an α -decay.

(ii) ${}_{56}^{133}\text{Ba}$ undergoes K-capture.

(iii) ${}_{82}^{210}\text{Pb}$ undergoes β^- -decay.

22. Draw the structure of a carbonyl group and indicate clearly (i) the hybridized state of carbon, (ii) the σ and π bonds present and (iii) the electrophilic and nucleophilic centres in it.

23. (a) Identify A and B in the following:



(b) Explain why the aromatic amines are less basic than ammonia and aliphatic amines.

24. On the basis of application, how are dyes classified? Describe essential features of any two of them.

25. (i) Assign appropriate reason for each of the following observations:

- (a) Anhydrous AlCl_3 is used as a catalyst.
 - (b) Phosphinic acid behaves as a monoprotic acid.
 - (c) SF_6 is not easily hydrolysed whereas SF_4 is readily hydrolysed.
 - (d) No form of elemental silicon is comparable to graphite.
- (ii) Draw the structure of XeOF_4 or BrF_3 .

26. (i) How would you account for the following:

- (a) The transition elements exhibit high enthalpies of atomization.
 - (b) The 4d and 5d series of the transition metals have more frequent metal-metal bonding in their compounds than do the 3d metals.
 - (c) There is a greater range of oxidation states among the actinoids than that in the lanthanoids.
- (ii) Write the complete chemical equation for each of the following:

- (a) An alkaline solution of KMnO_4 reacts with an iodide.
- (b) An excess of SnCl_2 solution is added to a solution of mercury(II) chloride.

27. Name the products obtained on complete hydrolysis of DNA. Enumerate the structural differences between DNA and RNA. In what way is a nucleotide different from a nucleoside? Illustrate with examples.

OR

27. Define and classify vitamins. Name the diseases caused due to lack of any three of them.

- End of Question Paper -