2019
CHEMISTRY

Total marks : 70 Time : 3 hours

General instructions :

i) Approximately 15 minutes is allotted to read the question paper and revise the answers.

ii) The question paper consists of 30 questions. All questions are compulsory.

iii) Marks are indicated against each question.

iv) Internal choice has been provided in some questions.

N.B: Check that all pages of the question paper is complete as indicated on the top left side.

1. The material that soften on heating to finally flow like a liquid is **1**
   (a) liquid (b) crystalline solid
   (c) amorphous solid (d) poly crystalline solid

2. The physical adsorption is due to **1**
   (a) strong coulombic forces (b) Vander waals' forces
   (c) hydrogen bonding (d) covalent bond formation

3. The hybridization of a tetrahedral complex ion is **1**
   (a) d^2sp (b) dsp^2
   (c) sp^3 (d) sp^2d

4. Haloalkanes can be converted to higher alkanes by **1**
   (a) Kolbe's reaction (b) Wurtz reaction
   (c) coupling reaction (d) hydrolysis reaction

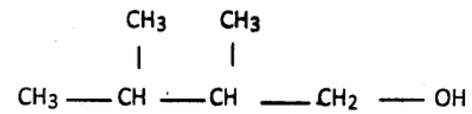
5. Which one of the following is not present in RNA? **1**
   (a) Uracil (b) Thamine
   (c) Ribose (d) Phosphate

6. What is corrosion? **1**

7. Define activation energy. **1**

8. Draw the structure of DDT. **1**

9. Write the IUPAC name of 1



10. What is Tollen's reagent test? 1

11. What is Van't Hoff's factor? What type of values can it have in solution, if the solute molecules undergo association and dissociation? 2

12. **a.** Why is $La(OH)_3$ more basic than $Lu(OH)_3$.
Or 2
b. Why do transition metal form coloured compounds?

13. **a.** On the basis of VBT, predict the hybridization, number of unpaired electrons, magnetic behaviour and structure of $[Cr(NH_3)_6]^{3+}$
Or 2
b. Write the IUPAC name of the following complexes :
i) $[Fe(EDTA)]^-$ ii) $K_2[PtCl_6]$

14. Explain SN^1 reaction mechanism of haloalkanes. 2

15. What is Gabriel- phthalimide reaction? Give the reaction. 2

16. **a.** Complete the following reaction.
(i) $CH_3CONH_2 + Br_2 + 4KOH \longrightarrow ? + ? + ? + ?$
(ii) $CH_3CH_2NH_2 + HNO_2 \xrightarrow{<5°C} ? + ? + ?$
Or 2
b. Explain carbylamine reaction?

17. A unit cell of an element of atomic mass 108 and density $10.5 gcm^{-3}$ is a cube with edge length 409 Pm. Find the structure of the crystal lattice.
($N_A = 6.023 \times 10^{23} mol^{-1}$) 3

18. **a.** A solution of 3.795g sulphur in 100g carbon disulphide (boiling point, 46.30°C) boils at 46.66°C. What is the formula of sulphur molecules in the solution?
K_b for carbon disulphide is 2.42 K Kg mol^{-1}.
Or 3
b. Find the (i) boiling point and (ii) freezing point of a solution containing 0.520g glucose ($C_6H_{12}O_6$) dissolved in 80.2 g of water. For water, K_f = 1.86 k/m and K_b=0.52k/m.

19. Define molecularity of a reaction. The reaction $3A \longrightarrow 2B+C$ is carried out in a closed vessel. The rate of disappearance of $A\left[\frac{-d[A]}{dt}\right]$ in $0.1 mol\ L^{-1}\ S^{-1}$. Calculate $\frac{d[B]}{dt}$ and $\frac{d[C]}{dt}$. 3

20. What are homogeneous and heterogeneous catalysis ? Give one example each. 3

21. **a.** How can copper be extracted from hydrometallurgical process.
Or 3
b. Explain Mond's process for extraction of nickel.

22. (i) Phosphorous form pentahalide, while nitrogen does not. Explain.
(ii) Draw the structure of PCl_5
(iii) Give one industrial use of nitrogen. 3

23. Give the oxidation reaction of $KMnO_4$ in acidic, alkaline and neutral medium. 3

24. How can primary, secondary alcohols be distinguished by Lucas test? 3

25. **a.** Give the reaction of glucose with Tollen's reagent and Fehling's solution.
Or 3
b. (i) What are nucleosides and nucleotides?
(ii) Name one water soluble vitamin.

26. **a.** Define condensation polymer. Write the chemical equation for the synthesis of bakelite.
Or 3
b. What are homopolymer and copolymer? Give one example of each.

27. (i) How do antiseptic differ from disinfectants? Give one example of each.
(ii) What are food preservatives? 3

28. a. (i) Define molar conductivity. Mention the effect of temperature on molar conductivity.
(ii) In a conductivity cell, electrodes of $4cm^2$ area of cross section are placed at a distance of 2 cm from each other. At 298 K, a $\frac{M}{100}$ solution of an electrolyte recorded a resistance of 350Ω. Determine the molar conductivity of the electrolyte.

Or 5

b. (i) What are fuel cells? Write two advantages of a fuel cell.
(ii) Calculate the number of coulombs required to deposit 40.5 g of Al when electrode reaction is $Al^{3+} + 3e^- \longrightarrow Al(s)$.

29. a. (i) What are inter- halogen compounds?
(ii) Draw the structure of IF_7, BrF_3 and ClF_3 and mention the type of hybridisation and geometry in each case.

Or 5

b. (i) List three oxoacids of sulphur in different oxidation states and draw their structures.
(ii) H_2O is liquid where as H_2S is gas at room temperature. Give reason.

30. a. (i) Give the reaction involved in
(A) Wolf-Kishner reduction
(B) Clemmensen reduction.
(ii) Explain HVZ reaction with an example.

Or 5

b. (i) Why aldehydes and ketones undergo a large number of nucleophilic addition reaction.
(ii) What is Gattermann-Koch reaction? Write chemical reaction involved in it.

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