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**

    $$CH_3 - \underset{\underset{CH_3}{|}}{CH} - \underset{\underset{CH_3}{|}}{CH} - CH_2 - OH$$

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) $CH_3CH_2NH_2 + HNO_2 \xrightarrow{\langle 5°C}$? + ? + ?
                          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 in100g 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}

<div align="center">**Or**</div>   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 $K_b = 0.52$k/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 0.1mol 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.

<div align="center">**Or**</div>   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.

<div align="center">**Or**</div>   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.

<div align="center">**Or**</div>   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 4 cm^2 area of cross section are placed at a distance of 2 cm from each other. At 298 K, a $\dfrac{M}{100}$ 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_5 and ClF_5 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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