CHEMISTRY

1. How many lattices points are there in one unit cell of face centred cubic lattice? [1]
2. State Henery's law. [1]
3. Draw the structure of the compound: N- Ethyl – N- Methyl Benzamide. [1]
4. Mention the factors that affect the rate of a chemical reaction. [1]
5. Explain why the bond order of N2 is greater than N2+, but the bond order of O2 is less that that of O2+. [2]
6. Calculate $\Delta_r G^o$ for conversion of oxygen to ozone $\frac{3}{2}O_2(g) \rightarrow O_3(g)$ at 298k, if kp for this conversion is 2.47 x 10-29. [2]
7. Are all the five bonds in Pd5 molecule equivalent? Justify your answer with structure.
8. Give the reagents to bring about the following transformations:
(a) Butane- 10*l* to Butanal (b) Cyclohexanol to cyclohexanone. [2]
9. N,-N-Diethyl-m-toluamide is an active ingredient in many insect-repellent preparation. How will you prepare this compound from m-bromotoluene? [2]
10. How is bakelite formed? Explain the reactions with equations. [2]
11. Draw simple Fischer projections of D. and L-glucose. Are these enantiomers? [2]
12. Calculate the de-Broglie wave length of an electron traveling at 1% of the speed of light.
[3]
13. Calculate the efficiency of packing in case of a metal crystal for 'face centred cubic'. [3]
14. For the water gas reaction: $C(S)+H_2O(g) \rightarrow CO(gas)+H_2(g)$, the standard Gibbs energy of reaction (at 1000k) is -8.1KJ mol^{-1}. Calculate its equilibrium constant. [3]
15. 18g of glucose, $C_6H_{12}O_6$, is dissolved in 1kg of water in a saucepan. At what temperature will the water boil (1.013 bar pressure). K_b for water is 0.52 K kg mol^{-1}. [3]
16. A reaction is second order with respect to a reaction. How is the rate of reaction affected if the concentration of the reactant is (i) doubled (ii) reduced to ½ ? [3]
17. Explain the following terms: (i) Peptisation (ii) Electrophoresis (iii) Electro dialysis. [3]
18. (i) Given IOPAC name of [Pt cl $(NH_3)_5$] cl_3 [3]
(ii) Write the structure of Pentoaquachloromium(iii) chloride.
(iii) Draw structures of geometrical isomers of $[COCL_2 (NH3)_4]^+$.
19. Calculate $^tY_2$ for $^{241}A_m$ in years given that it emits 1.2 x 10^{11} α particles per gram second. [3]
20. How is ethene -1,2 diol prepared form (i) ethylene oxide (ii) ethane (iii) 1,2 dibromo ethane. [3]
21. Write short noteson (i) Kolbe reaction (ii) Cross aldol condensation. [3]
22. Name the deficiency diseases caused due t pack vitamin C, E, B, B_{12}, B_6 and K. [3]
23. (a) What propellants have been used in PSLV-C4 rocket? [3]
(b) Describe with suitable examples (i) Antioxidants (ii) Artificial sweeteners.
24. Describe the preparation of potassium permanganate. How does the acidified permanganate solution reacts with (a) iron (II) Ions (b) SO_2 (c) Oxalic acid? Write the

ionic equations for the reactions. [5]

25. Three electrolytic cells A,B,C containing solutions of $ZnSO_4$, $AgNO_3$ and $CuSO_4$ respectively are connected in series. A steady current of 1.5 Amp. was passed through them until 1.45 g of silver deposited at the cathode of cell B. How long did the current flow? What mass of copper and of zinc were deposited? [5]

26. (a) On what ground can you say that scandium is a transition element but zinc is not.

(b) Evaluate the magnetic moment of a divalent ion in aqueous solution if it atomic number is 25.

(c) Using VSEPR theory, predict the probable structures of SO^2_3, IF^-_6 and ClO^-_4. [5]