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CBSE 12th Chemistry 2012 Unsolved Paper Outside Delhi

TIME - 3 HR. | QUESTIONS - 30

THE MARKS ARE MENTIONED ON EACH QUESTION

SECTION – A

Q. 1. How may the conductivity of an intrinsic semiconductor be increased? *1 mark*

Q. 2. Define 'peptization'. *1 mark*

Q.3. How is copper extracted from a low grade ore of it? *1 mark*

Q.4. Which is a stronger reducing agent, SbH_3 or BiH_3 , and why? *1 mark*

Q.5. What happens when bromine attacks $\text{CH}_2 = \text{CH} - \text{CH}_2 - \text{C} \equiv \text{CH}$? *1 mark*

Q.6. $\text{CH}_3 - \text{CH}_2 - \text{CH} = \text{CH} - \overset{\text{O}}{\underset{\text{||}}{\text{C}}} - \text{H}$ *1 mark*

Q.7. Write the structure of the product obtained when glucose is oxidized with nitric acid. *1 mark*

Q. 8. Differentiate between disinfectants and antiseptics. *1 mark*

SECTION – B

Q. 9. Express the relation among cell constant, resistance of the solution in the cell and conductivity of the solution. How is molar conductivity of a solution related to its conductivity? *2 marks*

Or

The molar conductivity of a 1.5 M solution of an electrolyte is found to be $138.9 \text{ S cm}^2 \text{ mol}^{-1}$. Calculate the conductivity of this solution.

Q. 10. A reaction is of second order with respect to a reactant. How is its rate affected if the concentration of the reactant is (i) doubled (ii) reduced to half? *2 marks*

Q.11. Which methods are usually employed for purifying the following metals: *2 marks*

(i) Nickel

(ii) Germanium

Q. 12. Explain the following facts giving appropriate reason in each case: 2 marks

- (i) NF_3 is an exothermic compound whereas NCl_3 is not.
- (ii) All the bonds in SF_4 are not equivalent

Q.13. Complete the following chemical reaction equations: 2 marks

- (i) $\text{Cr}_2\text{O}_7^{2-} + \text{I}^- + \text{H}^+ \rightarrow$
- (ii) $\text{MnO}_4^- + \text{NO}_2^- + \text{H}^+ \rightarrow$

Q.14. Explain the mechanism of acid catalysed hydration of an alkene to form corresponding alcohol. 2 marks

Q.15. Explain the following behaviors:

- (i) Alcohols are more soluble in water than the hydrocarbons of comparable molecular masses.
- (ii) Ortho-nitrophenol is more acidic than ortho-methoxyphenol. 2 marks

Q. 16. Describe the following giving the relevant chemical equation in each case:

- (i) Carbylamines reaction
- (ii) Hofmann's bromamide reaction 2 mark

Q.17. Complete the following reaction equations: 2 marks

- (i) $\text{C}_6\text{H}_5\text{N}_2\text{Cl} + \text{H}_3\text{PO}_2 + \text{H}_2\text{O} \rightarrow$
- (ii) $\text{C}_6\text{H}_5\text{NH}_2 + \text{Br}_2(\text{aq.}) \rightarrow$

Q. 18. What are food preservatives? Name two such substances. 2 marks

SECTION – C

Q. 19. Copper crystallizes with face centered cubic unit cell. If the radius of copper atom is 127.8 pm, calculate the density of copper metal. 3 marks
(Atomic mass of Cu = 63.55 u and Avogadro's number $N_A = 6.02 \times 10^{23} \text{ mol}^{-1}$)

Or

Iron has a body centered cubic unit cell with the cell dimension of 286.65 pm. Density of iron is 7.87 g cm^{-3} Use this information to calculate Avogadro's number.
(Atomic mass of Fe = 56.0 u)

Q.20. The electrical resistance of a column of 0.05 M, NaOH solution of diameter 1 cm and length 50cm is $5.55 \times 10^3 \text{ ohm}$.
Calculate its resistivity, conductivity and molar conductivity. 3 marks

Q.21. The reaction, $\text{N}_2(\text{g}) + \text{O}_2(\text{g}) \rightleftharpoons 2\text{NO}(\text{g})$ contributes to air pollution whenever a fuel is burnt in air at a high temperature. At 1500 K, equilibrium constant K for it is 1.0×10^{-5} . Suppose in a case $[\text{N}_2] = 0.80 \text{ mol L}^{-1}$ and $[\text{O}_2] = 0.20 \text{ mol L}^{-1}$ before any reaction occurs. Calculate the equilibrium concentrations of the reactants and the product after the mixture has been heated to 1500 K. 3 marks

Q.22. Explain the following terms giving a suitable example for each: 3 marks

- (i) Aerosol
- (ii) Emulsion
- (iii) Micelle

Q. 23. How would you account for the following: 3 marks

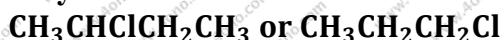
- (i) Among lanthanoids, Ln(III) compounds are predominant, However, occasionally in solutions or in solid compounds, +2 and +4 ions are also obtained.
- (ii) The $E_{M^{2+}/M}$ for copper is positive (0.34 V). Copper is the only metal in the first series of transition elements showing this behavior.
- (iii) The metallic radii of the third (5d) series of transition metals are nearly the same as those of the corresponding members of the second series.

Q.24. Name the following coordination entities and draw the structures of their stereoisomers: 3 marks

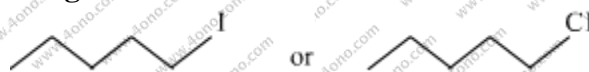
- (i) $[\text{Co}(\text{en})_2\text{Cl}_2]^+$ (en = ethan – 1, 2 – diamine)
- (ii) $[\text{Cr}(\text{C}_2\text{O}_4)_3]^{3-}$
- (iii) $[\text{Co}(\text{NH}_3)_3\text{Cl}_3]$
(Atomic numbers Cr=24, Co=27)

Q. 25. Answer the following questions: 3 marks

- (i) What is meant by chirality of a compound? Give an example.
- (ii) Which one of the following compounds is more easily hydrolyzed by KOH and why?



- (iii) Which one undergoes $\text{S}_\text{N}2$ substitution reaction faster and why?



Q.26. What is essentially the difference between α -glucose and β -glucose? What is meant by pyranose structure of glucose? 3 marks

Q.27. Differentiate between thermoplastic and thermosetting polymers. Give one example of each 3 marks

SECTION – D

Q.28. (a) Define the following terms: 5 marks

- (i) Mole fraction
- (ii) Ideal Solution

- (b) 15.0 g of an unknown molecular material is dissolved in 450 g of water. The resulting Solution freezes at -0.34°C . What is the molar mass of the material? (K_f for water = $1.86 \text{ K kg mol}^{-1}$)

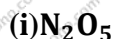
Or

(a) Explain the following:

- (i) Henry's law about dissolution of a gas in a liquid
- (ii) Boiling point elevation constant for a solvent

(b) A solution of glycerol ($C_3H_8O_3$) in water was prepared by dissolving some glycerol in 500 g of water. This solution has a boiling point of $100.42^\circ C$. What mass of glycerol was dissolved to make this solution? (K_b for water = $0.512 K kg mol^{-1}$)

Q.29. (a) Draw the molecular structures of the following compounds: 5 marks



(b) Explain the following observations:

- (i) Sulphur has a greater tendency for catenation than oxygen.
- (ii) ICl is more reactive than I_2 .
- (iii) Despite lower value of its electron gain enthalpy with negative sing, fluorine (F_2) is a stronger oxidising agent than Cl_2

Or

(a) Complete the following chemical equations:



(b) Explain the following observations:

- (i) Phosphorus has greater tendency for catenation than nitrogen.
- (ii) Oxygen is a gas but Sulphur a solid.
- (iii) The halogens are colored. Why?

Q. 30. (a) write a suitable chemical equation to complete each of the following transformations: 5 marks

(i) Butan-1-ol to butanoic acid

(ii) 4-Methylacetophenone to benzene-1, 4-dicarboxylic acid

(b) An organic compound with molecular formula $C_9H_{10}O$ forms 2,4-DNP derivative, reduces Tollen's reagent and undergoes Cannizzaro's reaction. On vigorous oxidation it gives 1,2-benzenedicarboxylic acid, Identify the compound.

Or

(a) Give chemical tests to distinguish between

- (i) Propanol and propanone
- (ii) Benzaldehyde and acetophenone

(b) Arrange the following compounds in an increasing order of their property as indicated:

- (i) Acetaldehyde, Acetone, Methyl tert-butyl ketone (reactivity towards HCN)
- (ii) Benzoic acid, 3,4-Dinitrobenzoic acid, 4-Methoxybenzoic acid (acid strength)
- (iii) $CH_3CH_2CH(Br)COOH$, $CH_3CH(Br)CH_2COOH$, $(CH_3)_2CHCOOH$ (acid strength)



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