

# First Term Examination (19 September 2017)

Class XII (Science)  
Subject - Chemistry  
(Set - B)

Time: 3hrs

M.M.70

## General Instructions:

- i) All questions are compulsory.
- ii) Q1 to 5 carry 1 mark each.
- iii) Q 6 to 10 carry 2 marks each.
- iv) Q 11 to 22 carry 3 marks each.
- v) Q 23 carries 4 marks.
- vi) Q 24 to 26 carry 5 marks each.
- vii) Use log tables, if necessary. Use of calculators is not allowed.

- Q1. Which crystal defect lowers the density of solid?
- Q2. What type of colloid is formed when a solid is dispersed in a liquid? Give an example.
- Q3. i) Name the element showing maximum number of oxidation states among the first series of transition for Sc to Zn  
ii) Name the element which show only +3 oxidation state.
- Q4. Complete the following equation:  $KMnO_4 \xrightarrow{\text{heat}}$
- Q5. What are the main constituents of dettol.
- Q6. What is the effect of adding catalyst on  
a) Activation energy ( $E_a$ )  
b) Gibbs energy of a reaction?
- Q7. Differentiate between thermoplastic and thermosetting polymers? Give one example.
- Q8. How do antiseptics differ from disinfectant? Give one example each.
- Q9. Explain what is observed when  
i) An electric current is passed through a colloidal sol.  
ii) When a beam of light is passed through a colloidal solution.
- Q10. Calculate the number of unit cells in 8.1gm of aluminum if it crystallizes in a face-centered cubic structure (Atomic Mass of Al = 27gm/mol)

OR

Silver crystallizes in fcc lattice. If the edge length of cell is  $4.077 \times 10^{-8}$  cm and density is  $10.5 \text{ g/cm}^3$ . Calculate the atomic mass of silver.

- Q11. a) Based on the nature of intermolecular forces, classify the following solids:  
Benzene, Silver  
b) AgCl shows Frenkel defect while NaCl does not. Give reason.  
c) What type of semiconductor is formed when Ge is doped with Al ?

- Q12.** Give reasons for the following:
- Red phosphorous is less reactive than white phosphorous.
  - Electron gain enthalpy of halogens are largely negative.
  - $N_2O_5$  is more acidic than  $N_2O_3$ .
- Q13.** A first order reaction takes 20 minutes for 25% decomposition. Calculate the time when 75% of the reaction will be completed.
- Q14.** A reaction is second order with respect to a reactant. How is the rate of reaction affected if the concentration of the reactant is (i) doubled (ii) reduced to  $\frac{1}{2}$ ?
- Q15.** Calculate the osmotic pressure in pascals exerted by a solution prepared by dissolving 1.0g of polymer of molar mass 185,000 in 450ml of water at  $37^\circ C$ .  
( $R=8.314 \times 10^3 \text{ Pa L K}^{-1} \text{ mol}^{-1}$ )
- Q16.**
- The cell in which the following reaction occurs:  
 $2Fe^{3+}(aq) + 2I^{-}(aq) \rightarrow 3Fe^{2+}(aq) + I_2(S)$  has  $E^0_{\text{cell}} = 0.236V$  at 298K. Calculate the standard Gibbs energy of the cell reaction (Given  $1F=96500C$ )
  - How many electrons flow through a metallic wire if a current of 0.5A is passed for 2 hours?
- Q17.** Account the following:
- Transition metals show variable oxidation states
  - $Zn, Cd$  and  $Hg$  are soft metals.
  - $E^0$  value for the  $Mn^{3+} / Mn^{2+}$  couple is highly positive (+1.57V) as compared to  $Cr^{3+} / Cr^{2+}$
- Q18.** Following are the transition metal ions of 3d series  
 $Ti^{4+}, V^{2+}, Mn^{3+}$   
(Atomic numbers = Ti=22, V=23, Mn=25)  
Answer the following:
- Which ion is a strong oxidizing agent & why?
  - Which ion is colourless and why?
- Q19.** Define the following: (i) Denaturation of protein (ii) Glycosidic linkage
- Q20.** Write the structures of the monomers used for getting the following polymers:  
(a) Poly vinyl chloride (b) Buna-N (c) Glyptal
- Q21.** Define the following (a) Anionic detergents  
(b) Narrow spectrum antibiotics  
(c) Antacids

**Q22.** Write one difference in each of the following:

- a) Multimolecular colloids and associated colloids
- b) Coagulation and peptization

**OR**

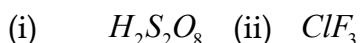
- a) Write the dispersed phase and dispersion medium of milk
- b) Write one similarity between physisorption and chemisorptions
- c) Write the chemical method by which  $\text{Fe}(\text{OH})_3$  sol is prepared from  $\text{FeCl}_3$ .

**Q23.** Shanti, a domestic helper of Mrs Anuradha, fainted while mopping the floor. Mrs. Anuradha immediately took her to the nearby hospital where she was diagnosed to be severely 'anaemic'. The doctor prescribed an iron rich diet and multivitamins supplement to her. Mrs. Anuradha supported her financially to get the medicines. After a month, Shanti was diagnosed to be normal.

After reading the above passage, answer the following questions:

- a) What values are displayed by Mrs. Anuradbha?
- b) Name the vitamin whose deficiency causes 'pernicious anaemia'.
- c) Give an example of a water soluble vitamin.

**Q24.** a) Draw the structures of

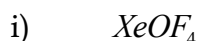


b) Explain the following observations

- (i)  $\text{H}_2\text{S}$  is more acidic than  $\text{H}_2\text{O}$ .
- (ii) Fluorine does not exhibit any positive oxidation state
- (iii) Helium forms no real chemical compound.

**OR**

a) Draw the structures of the following



b) What happens when:

- i)  $\text{XeF}_6$  is partially hydrolysed
- ii)  $\text{PCl}_5$  is heated
- iii)  $\text{H}_3\text{PO}_4$  is heated

**Q25.** a) A 10% solution of sucrose in water has a freezing point of 269.15K. Calculate the freezing point of 10% glucose in water if the freezing point of pure water is 273.15K. Given (Molar mass of sucrose = 342g/mol) **(2)**

(Molar mass of glucose = 180g/mol)

b) Define the following term:

- i) Molality (ii) Raoult's law

**OR**

- a) What type of deviation is shown by a mixture of ethanol and acetone? Give reason.
- b) A solution of glucose (Molar mass=180g/mol) in water labelled as 10% (by mass) What would be the molarity and molality of the solution? (Density of the solution = 1.2g/ml)

**Q26.**

- a) Write the name of the cell which is generally used in inverters. Write the reaction taking place at the anode and the cathode of this cell.
- b) How much electricity in terms of Faraday is required to produce.
  - i) 20.0g of Ca from molten CaCl<sub>2</sub>?
  - ii) 40.0g of Al from molten Al<sub>2</sub>O<sub>3</sub>

**OR**

- a) The chemistry of corrosion of iron is essentially an electrochemical phenomenon. Write the reactions occurring during the corrosion of iron in the atmosphere.
- b) Calculate the emf of the cell in which the following reaction takes place

