

First Term Examination (19 September 2017)

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

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. Define forbidden zone.
- Q2. What type of colloid is formed when a gas is dispersed in liquid. Give an example.
- Q3. Complete the following equation: $2MnO_4^- + 16H^+ + 5S^{2-} \rightarrow$
- Q4. What are Broad Spectrum antibiotics?
- Q5. Why transition metals act as good catalysts?
- Q6. Calculate number of unit cells in 8.1gm of aluminum if it crystallizes in a f.c.c. structure (Atomic Mass of Al = 27gm)

OR

An element crystallizes in fcc lattice with cell edge of 400pm. The density of the element is $7g/cm^3$. How many atoms are present in 208g of the element?

- Q7. What is the effect of temperature of physical and chemical adsorption?
- Q8. For a reaction $2NH_3(g) \xrightarrow{Pt} N_2(g) + 3H_2(g)$ $Rate = K$
- i) Write the order & molecularity of reaction
 - ii) Write the unit of K.
- Q9. Write mechanism of free radical polymerization of Ethene.
- Q10. What are biodegradable and non biodegradable detergents. Give examples.
- Q11. Give reasons (i) Sulphur shows more tendency for catenation than oxygen (ii) Acidic character decreases from HF to HI (iii) H_3PO_2 is stronger reducing agent than H_3PO_4 .
- Q12. The rate constant for the first order decomposition of H_2O_2 is given by following equation. $\log K = 14.2 - \frac{1.0 \times 10^4 K}{T}$ Calculate E_a for the reaction and rate constant K if its half life period is 200 minutes.

- Q13.** a) Why do ferrimagnetic substances show better magnetism than antiferromagnetic substances?
 b) What happens when CdCl_2 is doped with AgCl ?
 c) Based on the nature of inter molecular forces, classify the following substances:
 Hydrogen, Sodium sulphate
- Q14.** The rate constant for a first order reaction is 60 s^{-1} . How much time will it take to reduce the initial concentration of the reactants to its $1/16^{\text{th}}$ value?
- Q15.** Calculate E°_{cell} for the following reaction at 298K $E_{\text{cell}} = 0.261 \text{ V}$
 $2\text{Cr} + 3\text{Fe}^{2+} (0.01\text{M}) \rightarrow 2\text{Cr}^{3+} (0.01\text{M}) + 3\text{Fe}(s)$
- Q16.** Give reasons:
 (i) The Mn^{2+} compounds are more stable than Fe^{2+} towards oxidation to their +3 state.
 (ii) Transition metals are coloured.
 (iii) Zirconium and Hafnium exhibits similar properties
- Q17.** a) Write two differences between Lanthanoids & Actinoids
 b) How can you prepare KMnO_4 from Pyrolusite ore
- Q18.** a) Write one reaction of D-glucose which cannot be explained by its open chain structure.
 b) What type of linkage is present in nucleic acids?
 c) Give one example of water soluble vitamin.
- Q19.** Write structure & name of monomers of (a) Bakelite (b) Buna-S (c) Nylon-6
- Q20.** What do you mean by (a) Tranquillizers (b) cationic detergents (c) Food preservatives
- Q21.** Define the following (a) Zeta potential (b) O/W Emulsions (c) Multimolecular colloids
- Q22.** Calculate the Boiling point of solution when 2gm of Na_2SO_4 ($M = 142\text{g}$) was dissolved in 50g of water. Assuming Na_2SO_4 undergoes complete ionization.
 (K_b for water = $0.52\text{K kg}^{-1} \text{mole}^{-1}$)

OR

1gm of a non electrolyte solute dissolved in 50g of benzene lowered the freezing point of benzene by 0.40K . Find the molar mass of solute. (K_f for benzene = 5.12K kg/mole)

- Q23.** After watching a programme on TV about the presence of carcinogens (cancer causing agents) Potassium bromate and Potassium iodate in bread and other bakery products, Rupali a Class XII student decided to make others aware about the adverse effects of these carcinogens in foods. She consulted the school principal and requested him to instruct the canteen contractor to stop selling sandwiches, pizzas, burgers and other bakery products to the students. The principal took an immediate action and instructed the canteen contractor to replace the bakery products with some protein and vitamin rich food like fruits, salads, sprouts, etc. The decision was welcomed by the parents and the students.

After reading the above passage, answer the following questions:

- What are the values (at least two) displayed by Rupali?
- Which polysaccharide component of carbohydrates is commonly present in bread?
- Write the two types of secondary structures of proteins.
- Give two examples of water soluble vitamins.

Q24.

- Draw the structures of
 - XeF_6
 - H_3PO_4
- Explain the following
 - H_2Te is more acidic than H_2S .
 - Interhalogen compounds are more reactive than pure halogens.
 - PCl_5 is more covalent than PCl_3 .

OR

- Complete the equation
 - $XeF_6 + H_2O \rightarrow$
 - $PH_3 + HgCl_2 \rightarrow$
- Give reasons
 - $R_3P=O$ exists but $R_3N=O$ does not
 - White phosphorous is more reactive than red phosphorous
 - Sulphur in vapor state exhibits paramagnetism.

Q25.

- Write the name of the cell which is generally used in transistors. Write the reactions taking place at the anode and the cathode of the cell. (2)
- The conductivity of 0.001 mole Lt^{-1} solution of CH_3COOH is 3.905×10^{-5} s/cm. Calculate its molar conductivity and degree of dissociation.

$$\text{Given } \lambda_m^0 H^+ = 349.6 \text{ s cm}^2 \text{ mole}^{-1} \text{ \& } \lambda_m^0 CH_3COO^- = 40.9 \text{ s cm}^2 \text{ mole}^{-1}$$

OR

- State Kohlrausch law of independent migration of ions. Why does the conductivity of a solution decreases with dilution.
- A solution of $Ni(NO_3)_2$ is electrolysed between platinum electrodes using a current of 5 amp. for 20 minutes. What mass of nickel will be deposited at cathode. (At mass Ni=58.7gm)

- Q26.**
- a) State Henry's law. Give its two applications.
 - b) 30gm of urea (M_w=60g) is dissolved in 840g of water. Calculate the vapour pressure of water for this solution if vapour pressure of pure water is 23.8mm Hg at 298K.

OR

- a) Define molality (b) Abnormal Molar Mass
- c) Write two difference between ideal and non ideal solution.
- d) State Raoult's law for a solution containing volatile components. How does Raoult's law become a special case of Henry's law.