



**INDIAN SCHOOL SOHAR**  
**TERM I EXAMINATION (2018 – 19)**  
**CHEMISTRY**

CLASS : XII

MAX. MARKS : 70

DATE : 16.09.2018

DURATION : 3.00 HRS

**General Instructions:**

- (i) All questions are compulsory.
- (ii) Question numbers 1 to 5 very short answer questions carrying 1 mark each.
- (iii) Question numbers 6 to 12 are short answer questions carrying 2 marks each.
- (iv) Question numbers 13 to 24 are also short answer questions carrying 3 marks each.
- (v) Question numbers 25 and 27 are long answer questions carrying 5 marks each.
- (vi) Use log tables, if necessary, Use of calculator is not allowed.
- (vii) Constants:  $R = 0.083 \text{ L bar K}^{-1}\text{mol}^{-1} = 0.0821 \text{ LatmK}^{-1}\text{mol}^{-1} = 8.314 \text{ JK}^{-1}\text{mol}^{-1}$ .

1. How much charge in Faradays is required for the reduction of 1mol of  $\text{Al}^{3+}$ ?
  2. What is the basicity of  $\text{H}_3\text{PO}_4$ ?
  3. What happens when bromine attacks  $\text{CH}_2=\text{CH}-\text{CH}_2-\text{C}\equiv\text{CH}$ ?
  4. Haloalkanes easily dissolve in organic solvents. Why?
  5. Which of the following isomer is volatile? o-Nitrophenol or p-Nitrophenol
  6. (i) On mixing liquid X and liquid Y, the volume of the resulting solution increases. What type of deviation from Raoult's law is shown by the resulting solution? What change in temperature would you observe mixing liquids X and Y?  
 (ii) How can the direction of osmosis be reversed? Write one use of reverse osmosis.
  7. Define rate constant (k).  
 Write the unit of rate constant for the following:  
 (i) First order reaction                      (ii) Second order reaction
  8. Write the structures of the following:  
 (i)  $\text{H}_2\text{S}_2\text{O}_7$                                       (ii)  $\text{XeO}_3$
  9. Complete the following equations:  
 (i)  $\text{P}_4 + \text{H}_2\text{O} \rightarrow$   
 (ii)  $\text{XeF}_4 + \text{O}_2\text{F}_2 \rightarrow$
  10. Write chemical equations when:  
 (i) Ethyl chloride is treated with aqueous KOH.  
 (ii) Chlorobenzene is treated with  $\text{CH}_3\text{COCl}$  in presence of anhydrous  $\text{AlCl}_3$
- OR
- Write the structural formula of the following compounds:
- (i) 3-iodo-4-tert.butylheptane
  - (ii) 4-bromo-3-methylpent-2-ene
11. Name the reagents used in the following reactions:  
 (i) Nitration of phenol to 2,4,6-trinitrophenol  
 (ii) Butanal to butanol

- (iii) Friedel-Crafts acetylation of anisole  
 (iv) Oxidation of primary alcohol to aldehyde
12. Explain the mechanism of the following reaction:  

$$2\text{CH}_3\text{CH}_2\text{OH} \xrightarrow{H^+/413\text{ K}} \text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3 + \text{H}_2\text{O}$$
13. 3.9 g of benzoic acid dissolved in 49 g of benzene shows a depression in freezing point of 1.62 K. Calculate the van't Hoff factor and predict the nature of solute. (associated or dissociated) (Given Molar mass of benzoic acid = 122 g mol<sup>-1</sup>, K<sub>f</sub> for benzene = 4.9 K Kg mol<sup>-1</sup>)
14. Conductivity of 2.5 × 10<sup>-4</sup> M methanoic acid is 5.25 × 10<sup>-5</sup> Scm<sup>-1</sup>. Calculate its molar conductivity and degree of dissociation. (Given that λ<sup>0</sup>(H<sup>+</sup>) = 349.5 Scm<sup>2</sup>mol<sup>-1</sup> and λ<sup>0</sup>(HCOO<sup>-</sup>) = 50.5 Scm<sup>2</sup>mol<sup>-1</sup>).
15. One half-cell in a voltaic cell is constructed from a silver wire dipped in silver nitrate solution of unknown concentration. The other half-cell consists of a zinc electrode in a 0.10M solution of Zn(NO<sub>3</sub>)<sub>2</sub>. A voltage of 1.48V is measured for this cell. Use this information to calculate the concentration of silver nitrate solution. (Given E<sup>0</sup><sub>Zn<sup>2+</sup>/Zn</sub> = 0.76 V, E<sup>0</sup><sub>Ag<sup>+</sup>/Ag</sub> = 0.8 V)
16. What is a nickel-cadmium cell? State its one merit and one demerit over lead storage cell. Write the overall reaction that occurs during discharging of this cell.
17. For a decomposition reaction the values of rate constant, k at two different temperatures are given below:  
 k<sub>1</sub> = 2.15 × 10<sup>-8</sup> Lmol<sup>-1</sup>s<sup>-1</sup> at 650 K  
 k<sub>2</sub> = 2.39 × 10<sup>-7</sup> Lmol<sup>-1</sup>s<sup>-1</sup> at 700 K  
 Calculate the value of activation energy for this reaction. (Given R = 8.314 JK<sup>-1</sup>mol<sup>-1</sup>)
- OR
- (a) Show that for a first order reaction, the time required for half the change (half-life period) is independent of initial concentration.  
 (b) The rate constant for a reaction of zero order in A is 0.0030 molL<sup>-1</sup>s<sup>-1</sup>. How long will it take for the initial concentration of A to fall from 0.10 M to 0.075 M?
18. A first order reaction takes 10 minutes for 25% decomposition. Calculate t<sub>1/2</sub> for the reaction. (Given log 2 = 0.3010, log 3 = 0.4771, log 4 = 0.6021)
19. Give reasons for the following:  
 (a) Nitrogen exhibits +5 oxidation state, it does not form pentahalide.  
 (b) Electron gain enthalpy with negative sign of fluorine is less than that of chlorine.  
 (c) The two oxygen-oxygen bond lengths in ozone molecule are identical.
20. (a) Mention the optimum conditions for the industrial manufacture of ammonia by Haber's process.  
 (b) Explain the following giving appropriate reasons:  
 (i) Sulphur vapour exhibits paramagnetic behaviour.  
 (ii) Red phosphorus is less reactive than white phosphorus.
21. Give reasons for the following:  
 (a) Ethyl iodide undergoes S<sub>N</sub>2 reaction faster than ethyl bromide.  
 (b) (±) 2-Butanol is optically inactive.  
 (c) C-X bond length in halobenzene is smaller than C-X bond length in CH<sub>3</sub>-X.
22. (a) Write a chemical test to distinguish between:  
 (i) Chlorobenzene and benzyl chloride

- (ii) Chloroform and Carbon tetrachloride
- (b) Why is methyl chloride hydrolysed more easily than chlorobenzene?
23. (i) Give two examples of macromolecules that are chosen as drug targets.
- (ii) What are antiseptics? Give an example.
- (iii) Why is the use of aspartame limited to cold foods and soft drinks?
24. Explain the following terms giving one example of each type:
- (i) Antacids
- (ii) Disinfectants
- (iii) Enzymes
25. (a) The molecular masses of polymers are determined by osmotic pressure method and not by measuring other colligative properties. Give reasons.
- (b) At 300 K, 36 g of glucose,  $C_6H_{12}O_6$  present per litre in its solution has an osmotic pressure of 4.98 bar. If the osmotic pressure of another glucose solution is 1.52 bar at the same temperature, calculate the concentration of the other solution.

OR

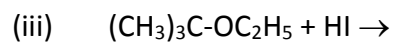
- (a) List any four factors on which the colligative properties of a solution depend.
- (b) Calculate the boiling point of one molar aqueous solution (density  $1.06 \text{ g mL}^{-1}$ ) of KBr. [Given that  $K_b$  for  $H_2O = 0.52 \text{ K kg mol}^{-1}$ , Atomic mass of K = 39 and Br = 80]
26. (a) Draw the structures of the following molecules:
- (i)  $(HPO_3)_3$                       (ii)  $BrF_3$
- (b) Complete the following chemical equations:
- (i)  $HgCl_2 + PH_3 \rightarrow$
- (ii)  $SO_3 + H_2SO_4 \rightarrow$
- (iii)  $XeF_4 + H_2O \rightarrow$

OR

- (a) What happens
- (i) Chlorine gas is passed through a hot concentrated solution of NaOH?
- (ii) Sulphur dioxide gas is passed through an aqueous solution of a Fe(III) salt?
- (b) Answer the following:
- (i) What is the basicity of  $H_3PO_3$  and why?
- (ii) Why does fluorine not play the role of a central atom in interhalogen compounds?
- (iii) Why do noble gases have very low boiling points?
27. (a) Write the mechanism of the following reaction:
- $$CH_3CH_2OH \xrightarrow{HBr} CH_3CH_2Br + H_2O$$
- (b) Write the equation involved in Reimer-Tiemann reaction.
- (c) How will you convert:
- (i) Propene to Propane-2-ol?
- (ii) Phenol to 2,4,6-trinitrophenol?

OR

- (a) State the products of the following reactions:
- (i)  $CH_3CH_2CH_2OCH_3 + HBr \rightarrow$
- (ii)  $C_6H_5OC_2H_5 + HBr \rightarrow$



(b) Explain the following:

- (i) Alcohols are more soluble in water than the hydrocarbons of comparable molecular masses.
  - (ii) Orthonitrophenol is more acidic than orthomethoxy phenol.
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