

Code: A-C337123-A

I Semester Exam – 2022-23

4 x 690

Std.: XII

Sub: CHEMISTRY

Marks: 70

Date: 25/11/2022

Roll No.: _____

Time: 3 hrs.

General Instructions :-**The question paper is divided into Four sections.**

1. **Section-A** : Q.No. 1 contains **Ten multiple choice** type of questions carrying **one mark** each.
Q.No. 2 contains **Eight very short answer** type of questions carrying **one mark** each.
2. **Section-B** : Q.No. 3 to Q.No. 14 contains **Twelve short answer - I** type of questions carrying **Two marks** each.
3. **Section-C** : Q.No.15 to Q.No. 26 contains **Twelve short answer - II** type of questions carrying **Three marks** each.
4. **Section-D** : Q.No. 27 to Q.No.31 contains **Five long answer** type of questions carrying **Four marks** each.
5. Use of logarithmic table is allowed. Use of calculator is not allowed.
6. Figures to the right indicate full marks.
7. For each MCQ, correct answer must be written along with its alphabet.
e.g. (a)/ (b)/ (c)/ (d), etc.
Only the first attempt will be considered for evaluation.
8. Physical constants :-
 $R = 8.314 \text{ JK}^{-1} \text{ mol}^{-1}$
Atomic Weights : H = 1, C = 12, N = 14, O = 16, Cl = 35.5

Section - A**Q.1 Select and write the correct answer.****10**

- i) Which of the following is a buffer solution?
 - a) $\text{CH}_3\text{COONa} + \text{NaCl}$ in water
 - b) $\text{CH}_3\text{COOH} + \text{HCl}$ in water
 - c) $\text{CH}_3\text{COOH} + \text{CH}_3\text{COONa}$ in water
 - d) $\text{HCl} + \text{NH}_4\text{Cl}$ in water
- ii) Henry's law constant for a gas CH_3Br is $0.159 \text{ mol dm}^{-3} \text{ atm}^{-1}$ at 25°C . What is the solubility of CH_3Br in water at 25°C at a partial pressure of 0.164 atm ?
 - a) 0.0159 molL^{-1}
 - b) 0.164 molL^{-1}
 - c) 0.026 M
 - d) 0.042 M
- iii) IUPAC name of $(\text{CH}_3)_3\text{C} - \text{CH}_2 - \text{CHI} - \text{CH}_3$ is _____
 - a) 2 - Iodo - 4, 4 - dimethylbutane
 - b) 4 - Iodo - 2, 2 - dimethylpentane
 - c) 3 - Iodo - 4, 4 - dimethyl pentane
 - d) 2 - Iodo - 4, 4 - dimethyl pentane
- iv) On acid hydrolysis; propanenitrile gives _____
 - a) Propanal
 - b) acetic acid
 - c) propionamide
 - d) propanoic acid
- v) Bond enthalpies of H - H, Cl - Cl and H - Cl bonds are 434 kJ mol^{-1} , 242 kJ mol^{-1} and 431 kJ mol^{-1} respectively. Enthalpy of formation of HCl is _____
 - a) 245 kJ mol^{-1}
 - b) -93 kJ mol^{-1}
 - c) -245 kJ mol^{-1}
 - d) 93 kJ mol^{-1}

P.T.O

- vi) The SI unit of molar conductivity is _____
 a) $S\text{ cm}^2\text{ mol}^{-1}$ b) $S\text{ dm}^2\text{ mol}^{-1}$
 c) $S\text{ m}^2$ d) $S\text{ m}^2\text{ mol}^{-1}$
- vii) Select the major product formed from the reaction of 2 - Bromobutane and alcoholic KOH.
 a) $\text{trans CH}_3 - \text{CH} = \text{CH} - \text{CH}_3$ b) $\text{cis CH}_3 - \text{CH} = \text{CH} - \text{CH}_3$
 c) $\text{CH}_2 = \text{CH} - \text{CH}_2 - \text{CH}_3$ d) $\text{CH}_2 = \text{CH} - \text{CH}_3$
- viii) Consider the following sequence of reaction
 $(\text{CH}_3)_2\text{CHBr} \xrightarrow[\text{KOH}]{\text{alcoholic}} \text{X} \xrightarrow{\text{HBr}} \text{Y} \xrightarrow[\text{aqueous}]{\text{KOH}} \text{Z}$ the end product Z is _____
 a) $(\text{CH}_3)_2\text{CHOH}$ b) $\text{CH}_3 - \text{CH} = \text{CH}_2$
 c) $\text{CH}_3 - \text{CH}_2 - \text{CH}_2\text{OH}$ d) None of these
- ix) Benzaldehyde does NOT show positive test with _____.
 a) Schiff reagent b) Tollen's reagent
 c) Sodium bisulphite solution d) Fehling solution
- x) The enthalpy of formation for all elements in their standard states is _____.
 a) Unity b) Zero
 c) Less than zero d) different elements

Q.2 Answer the following.

8

- i) Define 'Isotonic solution'.
- ii) The pK_a values of HCl and HI are -7.0 and -10.0 respectively. Which is stronger acid?
- iii) How will you convert ethyl alcohol to ethanal?
- iv) Write the Henderson-Hasselbach equation for acidic buffer.
- v) State Hess's Law of constant heat summation.
- vi) Convert benzyl alcohol to benzyl cyanide.
- vii) Convert But-1-ene to n-butyl iodide.
- viii) Represent the cell from the following given reaction :-
 $\text{Cl}_{2(g)} + 2\text{Ag}_{(s)} \longrightarrow 2\text{Ag}^+_{(aq)} + 2\text{Cl}^-_{(aq)}$

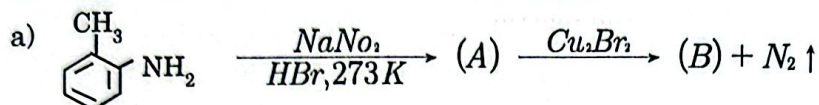
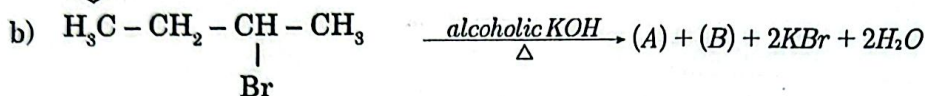
Section -B**Attempt any EIGHT.**

16

- Q.3** State and explain "Markownikoff's rule" with a suitable example.
- Q.4** Boiling point of alcohols are much higher than those of the corresponding alkanes. Explain.
- Q.5** How is benzyl chloride converted into phenyl ethanoic acid? Write the reactions.
- Q.6** What is molal elevation constant? Does it depend on nature of solute?
- Q.7** Aqueous solution of bismuth chloride is acidic. Explain.
- Q.8** A carbonyl compound 'A' having molecular formula $\text{C}_9\text{H}_{10}\text{O}$ forms crystalline precipitate with sodium bisulphite and give positive iodoform test but doesn't reduce Fehling's solution. Write the structure of carbonyl compound.
- Q.9** A free expansion of gas results into no work. Explain.

Q.10 The conductivity of 0.02M AgNO_3 at 25°C is $2.428 \times 10^{-3} \Omega^{-1} \text{cm}^{-1}$. What is its molar conductivity.

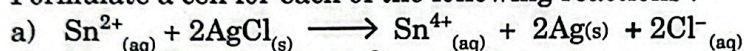
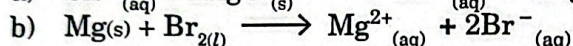
Q.11 Identify 'A' and 'B' and rewrite the reactions.



Q.12 Define carbolic acid? How carbolic acid is prepared from benzene sulphonic acid?

Q.13 Distinguish between Isothermal and Adiabatic process. S.T.S

Q.14 Formulate a cell for each of the following reactions :-



Section - C

Attempt any EIGHT.

24

Q.15 Write the Raoult's law for solutions of non-volatile solute. How will you calculate molar mass of solute from boiling point elevation? S.I.R

Q.16 Write the structure and IUPAC names of all the metamers represented by formula $\text{C}_4\text{H}_{10}\text{O}$. S.R

Q.17 Give a simple chemical test to distinguish between ethanol and ethyl bromide. Explain why phenol is more acidic than ethyl alcohol. S

Q.18 What is enthalpy of atomization? Obtain the expression for work done in a chemical reaction. S

Q.19 Explain electrolysis of molten NaCl . S

Q.20 What is dehydrohalogenation? Explain it with suitable example. S

Q.21 Dissociation of HCN is suppressed by addition of HCl . Explain. What is the nature of aqueous solution of ammonium acetate?

Q.22 The vapour pressure of 2.1% solution of non-electrolyte in water at 100°C is 755 mm Hg. Calculate the molar mass of solute. S.P

Q.23 Write a note on Williamson's Synthesis. Mention two uses of ethoxyethane.

Q.24 How will you prepare ethanal from 1, 1 - dichloroethane? What is the reaction of acetaldehyde with

a) Ammonical silver nitrate.

b) Fehling's solution?

Q.25 Calculate emf of the following cell at 25°C .



$$E^\circ_{\text{Zn}} = -0.76\text{V}, E^\circ_{\text{Cr}} = -0.74\text{V}$$

Q.26 Derive the expression for the maximum work. = R.T.S.

Section - D

12

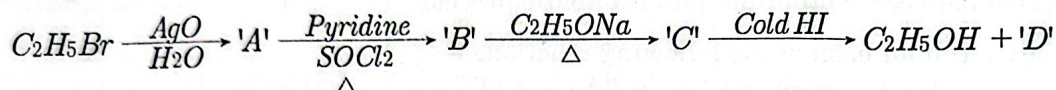
Attempt any Three.

- Q.27 a) Draw neat and labelled diagram of dry cell. 2.5,
 b) A solution of a substance having mass 1.8×10^{-3} kg has the osmotic pressure of 0.52 atm at 280K. If the volume is 1 dm³. Calculate the molar mass of the substance used.

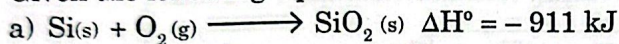
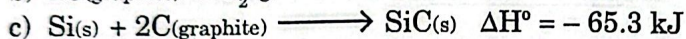
Q.28 Write a note on aldol condensation. 2.5

Q.29 Define degree of dissociation. Derive Ostwald's dilution law for CH₃COOH.

Q.30 Complete the following reaction and identify A, B, C and D with correct formulae.



Q.31 a) Given the following equations and ΔH° values at 25°C.



Calculate ΔH° for the reaction $SiO_2(s) + 3C(\text{graphite}) \longrightarrow SiC(s) + 2CO(g)$

b) What are intensive properties.

vs. f