# Click here Explore CheMentor





# SAMPLE PAPER (

(Code: VSSPXII-E2)

**CHEMISTRY PAPER 1** (THEORY)

Time allowed: 3 Hours



**Tull Marks: 70** 

# Exam Guidelines 📝

- Sections Overview:
  - This paper is segmented into four sections A, B, C, and D. Ensure to attempt all questions.
- Section-wise Breakdown:
  - Section A: One question with sub-parts, each carrying one mark.
  - Section B: Ten questions, each carrying two marks.
  - Section C: Seven guestions, carrying three marks. (One internal choice)
  - Section D: Three questions, carrying five marks each. (One internal choice)
- **Work and Rough Work:** Do all working and rough work on the same sheet, next to your answers.
- Balanced Equations and Diagrams: Use balanced equations and diagrams for clarity if beneficial.
- Numerical Problem Solving: For numerical problems, showcase all essential working to ensure clarity.
- **Data Reference:** Utilize the following data when solving problems:
  - Gas constant (R): 1.987 cal deg ¬ mol ¬, 8.314 J K ¬ mol ¬, 0.0821 dm³ atm K ¬ mol ¬.
  - $1 L atm = 1 dm^3 atm = 101.3 J.$
  - 1 Faraday = 96500 coulombs.
  - Avogadro's number =  $6.023 \times 10^{23}$ .

**Very Similar Set of 10 Sample Papers** Replica of Specimen Paper issued by CISCE **ISC CHEMISTRY 2024** 

Click here to buy the Sample Papers

# **SECTION A – 14 MARKS**

# **Question 1**

Question 1
(A) Fill in the blanks by choosing the appropriate word(s) from those given in the brackets: [zero, carbocation, trichloroethanal, first, HCl, ethanal, nucleophilic, ethanol, H <sub>2</sub> SO <sub>4</sub> , carbanion, second, electrophilic, one, two, three, catalyst, benzyne]
(i) The hydrolysis of ethyl acetate in acidic medium is an example of order reaction and the molecularity of the reaction is
(ii) In the complex ion $[Co(NH_3)_2(H_2O)_2Cl_2]^+$ , the coordination number and the oxidation number of the central metal ion are and respectively.
(iii) When chlorobenzene is treated with in presence of concentrated, DDT is formed.
(iv) Formation of phenol from chlorobenzene is an example of aromatic substitution occurring through mechanism.
(B) Select and write the correct alternative from the choices given below:
(i) For 0.01M CH <sub>3</sub> COOH solution, $\lambda_{m}$ is 7.9 ohm <sup>-1</sup> cm <sup>2</sup> mol <sup>-1</sup> . If $\lambda_{m}^{\circ} = 390$ ohm <sup>-1</sup> cm <sup>2</sup> mol <sup>-1</sup> , then what will be the degree of dissociation? (a) $2 \times 10^{-4}$ (b) $1.85 \times 10^{-1}$ (c) 0.02 (d) 0.20
<ul> <li>(ii) Pick out the correct statement with respect to [Mn(CN)<sub>6</sub>]<sup>2-</sup></li> <li>(a) It is dsp<sup>2</sup> hybridized, tetrahedral</li> <li>(b) It is sp<sup>3</sup>d<sup>2</sup> hybridized, octahedral</li> <li>(c) It is d<sup>2</sup>sp<sup>3</sup> hybridized, octahedral</li> <li>(d) It is d<sup>2</sup>sp<sup>3</sup> hybridized, square planar</li> </ul>
(iii) Zr (atomic number = 40) and Hf (atomic number = 42) have similar atomic and ionic radii because of  (a) Having similar chemical properties
(a) Traving similar element properties

- **(b)** Belonging to the same group
- (c) Diagonal relationship
- (d) Lanthanoid contraction
- (iv) If aniline is treated with 1:1 mixture of con. HNO<sub>3</sub> and con. H<sub>2</sub>SO<sub>4</sub>, then p-nitroaniline and m-nitroaniline are formed nearly in equal amounts. This is due to the
  - (a) protonation of –NH<sub>2</sub> which causes deactivation of benzene ring
  - **(b)** *m*-directing property of –NH<sub>2</sub> group
  - **(c)** isomerization of some p-nitroaniline into *m*-nitroaniline
  - (d) m- & p-directing property of -NH<sub>2</sub> group

- (v) Which of the following aqueous solutions has the highest freezing point?
  - (a) 0.01 M NaCl
  - **(b)** 0.01 M Na<sub>2</sub>SO<sub>4</sub>
  - (c) 0.1 M NaCl
  - (d) 0.1 M Sucrose
- (vi) Assertion: Rusting of iron is quicker in saline water than in ordinary water.

**<u>Reason:</u>** The presence of Na<sup>+</sup> and Cl<sup>-</sup> ions increases the conductance of the solution in contact with metal surface.

- (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
- (b) Both Assertion and Reason are true but Reason is not the correct explanation for Assertion.
- (c) Assertion is true but Reason is false.
- (d) Assertion is false but Reason is true.
- (vii) <u>Assertion</u>: Hoffmann's bromamide degradation reaction is given by primary amines.

**Reason:** Primary amines are more basic than secondary amines.

- (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
- (b) Both Assertion and Reason are true but Reason is not the correct explanation for Assertion.
- (c) Assertion is true but Reason is false.
- (d) Both Assertion and Reason are false

#### (c) Read the passage given below carefully and answer the questions that follow.

Boiling point or freezing point of liquid solution would be affected by the dissolved solids in the liquid phase. A soluble solid in solution has the effect of raising its boiling point and depressing its freezing point. The addition of non-volatile substances to a solvent decreases the vapour pressure and the added solute particles affect the formation of pure solvent crystal. According to many researches the decrease in freezing directly correlated to the concentration of solute dissolved in solvent. This phenomenon is expressed as freezing point depression and it is useful for several applications such as freeze concentration of liquid food and to find the molar mass of an unknown solute in the solution.

- (i) Why the addition of non-volatile solute to a solvent decreases the vapour pressure of the solvent?
- (ii) Out of 1% sucrose solution and 1% NaCl solution, which has the least freezing point and why?
- (iii) The freezing point of a solution having  $50 \text{ cm}^3$  of ethylene glycol (molar mass =  $62 \text{ g mol}^{-1}$ ) in 50 g water is found to be -34 °C. Calculate the density of ethylene glycol assuming ideal behaviour. [K<sub>f</sub> for water =  $1.87 \text{ K Kg mol}^{-1}$ ]

#### **SECTION B – 20 MARKS**

# **Question 2**

Arrange the following in:

(i) increasing order of solubility in water

C<sub>2</sub>H<sub>5</sub>Cl, C<sub>2</sub>H<sub>5</sub>NH<sub>2</sub>, C<sub>2</sub>H<sub>5</sub>OH

(ii) decreasing boiling point

CH<sub>3</sub>COOH, C<sub>2</sub>H<sub>5</sub>OH, CH<sub>3</sub>NH<sub>2</sub>, CH<sub>3</sub>OCH<sub>3</sub>

# **Question 3**

Answer the following questions based on the following elements from the 3d transition series:

#### Sc, Ti, Cr Mn, Fe and Co

- (i) Write the name of the element showing maximum number of oxidation state. Give reason.
- (ii) Which element has the highest melting point?

# **Question 4**

Give one good chemical test to distinguish between the following pair of compounds:

- (i) Acetophenone and benzophenone
- (ii) Acetamide and acetaldehyde

# **Question 5**

- (i) Calculate the 'spin only magnetic moment' of the divalent cation whose atomic number is 26.
- (ii) What are different oxidation states of lanthanoids observed other than common oxidation state?

# **Question 6**

- (i) Among all the isomers of molecular formula  $C_4H_9Br$ , identify the two isomers which give same product on dehydrohalogenation with alcoholic KOH.
- (ii) Racemic mixture is optically inactive. Why?

# **Question 7**

A strip of nickel metal is placed in a 1 molar solution of  $Ni(NO_3)_2$  and a strip of silver metal is placed in a 1 molar solution of  $AgNO_3$ . An electrochemical cell is created when the two solutions are connected by a salt bridge and the two strips are connected by wires to a voltmeter.

- (i) Write the balanced equation for the overall reaction occurring in the cell.
- (ii) Calculate the cell potential, E, at  $25^{\circ}$ C for the cell if the initial concentration of Ni(NO<sub>3</sub>)<sub>2</sub> is 0.100 molar and the initial concentration of AgNO<sub>3</sub> is 1.00 molar.

$$\left[E_{Ni^{2+}/Ni}^{0} = -0.25V; E_{Ag^{+}/Ag}^{0} = 0.80V, \log 10^{-1} = -1\right]$$

# **Question 8**

What happens when (write chemical reactions only)

- (a) diethyl ether is allowed to stand in contact with air?
- **(b)** 2-methoxy-2-methylpropane is heated with HI?

# **Question 9**

Rikta mixes 0.30 g of acetic acid with 100 g of benzene and notices that the boiling point increases by 0.0633 °C. Can you help her figure out the molecular weight of acetic acid? Also, based on this, what can we say about the form of the acetic acid molecules in the solution?

(Given,  $K_b$  for benzene is 2.53 K kg mol<sup>-1</sup>, and the atomic weights are C = 12, H = 1, O = 16)

[Help means you are to calculate in your answer script]

# **Question 10**

Give a reason for each of the following:

- (i) Treatment of benzaldehyde with HCN gives a mixture of two isomers which cannot be separated even by careful fractional distillation.
- (ii) Sodium bisulphite is used for the purification of aldehydes and ketones.

# **Question 11**

Complete the following chemical equations:

(i) 
$$MnO_4^-(aq) + C_2O_4^{2-}(aq) + H^+(aq) \rightarrow$$

(ii) 
$$Cr_2O_7^{2-}(aq) + Fe^{2+}(aq) + H^+(aq) \rightarrow$$

# **SECTION C – 21 MARKS**

# **Question 12**

The data given below is for the reaction between NO and Cl<sub>2</sub> to form NOCl at 295K.

S.	Conc. Cl <sub>2</sub>	Conc. NO	Initial reaction
No.	(mol/L)	(mol/L)	rate
			(mol/L/s)
1	0.05	0.05	1.0 x10 <sup>-3</sup>
2	0.15	0.05	3.0 x10 <sup>-3</sup>
3	0.05	0.15	9.0 x10 <sup>-3</sup>

Answer the following questions:

- (i) What is the order with respect to NO and  $Cl_2$  in the reaction?
- (ii) Write the rate expression.
- (iii) Calculate the rate constant.

#### **Question 13**

Nehan was provided with two test tubes, each containing either ethyl amine or aniline. Upon adding a reagent  $\mathbf{R}$  to both tubes, he noticed the formation of a yellow dye in only one of them.

- (i) Determine the identity of reagent  $\mathbf{R}$ .
- (ii) Explain why this reagent is not commonly found in laboratories. (Support your answer by balanced chemical equation)
- (iii) Draw the molecular structure of the yellow dye produced.

# **Question 14**

Answer of the following questions:

- (i) State the type of bonds which hold the monomers of DNA together.
- (ii) What is a zwitter ion?
- (iii) Name the vitamins which cures the deficiency of the following diseases.
  - (a) Scurvy
  - **(b)** Night blindness

# **Question 15**

- (i) The osmotic pressure of blood is 7.65 atm at 27 °C. How much weight of glucose should be used per litre to prepare an intravenous injection that has the same osmotic pressure as blood?
- (ii) Arrange the following in the increasing order of osmotic pressure.
  - 0.1 M urea, 0.1 M NaCl, 0.1 M glucose, 0.1 M MgCl<sub>2</sub>, 0.1 M AlCl<sub>3</sub>

#### **Question 16**

Identify the compounds [A], [B] and [C].

(i) 
$$CH_3COOH$$
  $\longrightarrow$  A  $\longrightarrow$  B  $\xrightarrow{Br_2/KOH}$  C

(ii) 
$$CI \xrightarrow{CH_3Cl} A \xrightarrow{CrO_2Cl_2} B \xrightarrow{Conc. H_2SO_4} C$$

# **Question 17**

- (i) How will the following be obtained? (Give chemical equations only)
  - (a) Diethyl ether form ethanol
  - (b) Anisole from phenol
  - (c) Iodoform to formic acid

OR

(ii) Write the mechanism of aldol condensation.

#### **Question 18**

- (i) A first order reaction is 20% complete in 5 minutes. Calculate the time taken to complete 60% of the reaction.
- (ii) The conversion of molecules A into B follows second order kinetics. If the concentration of A is increased to three times, how will it affect the rate of formation of B?

# SECTION D - 15 MARKS

# **Question 19**

(i) Give a reason for each of the following:

- [2]
- (a) Oxidation of toluene to benzaldehyde with CrO<sub>3</sub> is carried out presence of acetic anhydride and not in presence of H<sub>2</sub>SO<sub>4</sub>.
- **(b)** Oximes are more acidic than hydroxylamine.
- (ii) An organic compound (A) on treatment with ethyl alcohol gives a carboxylic acid (B) and compound (C). Hydrolysis of (C) under acidified conditions gives (B) and (D). Oxidation of (D) with KMnO<sub>4</sub> also gives (B). (B) on heating with Ca(OH)<sub>2</sub> gives (E) having molecular formula  $C_3H_6O$ . (E) does not give Tollen's test and does not reduce Fehling's solution but forms a 2, 4-dinitrophenylhydrazone. Identify (A), (B), (C), (D) and (E). [3]

#### **Question 20**

- (i) Which compound is used in estimation of hardness of water volumetrically? [1]
- (ii) When a co-ordination compound CoCl<sub>3</sub>.6NH<sub>3</sub> is mixed with AgNO<sub>3</sub>, 3 moles of AgCl are precipitated per moles of the compound. Write the structural formula of the complex. [1]
- (iii) Write the IUPAC name of the coordination compound:  $K_3[Fe(C_2O_4)_3]$ . [1]
- (iv) For the complex ion  $[Co(NH_3)_6]^{3+}$ , state the hybridization and magnetic nature. [1]
- (v) Explain on the basis of CFT why  $[Sc(H_2O)_6]Cl_3$  is colourless and  $[Ti(H_2O)_6]Cl_3$  is coloured. [1]

# **Question 21**

- (i) (a) Define Kohlrausch law. [1]
- (b) Calculate the number of coulombs required to deposit 5.4 g of aluminium (atomic mass = 27) when the electrode reaction is  $Al^{3+} + 3e^{-} \rightarrow Al$ . [1]
- (c) The resistance of 0.02 M KCl solution was 225 ohm. The conductivity of 0.02 M KCl solution was 0.0027 ohm<sup>-1</sup> cm<sup>-1</sup>. The resistance of 0.1 M CuSO<sub>4</sub> solution was found to be 37.5 ohm using the same cell. Calculate the equivalent and molar conductivities of CuSO<sub>4</sub> solution. [3]

OR

- (ii) (a) A 0.06 molar CH<sub>3</sub>COOH solution offers a resistance of 55 ohm to a conductivity cell at 25 °C. If the cell constant is 0.45 cm<sup>-1</sup> and the molar conductance of CH<sub>3</sub>COOH at infinite dilution is 398.5 ohm<sup>-1</sup> cm<sup>2</sup> mol<sup>-1</sup>. Calculate: [3]
  - a) Specific conductance
  - **b)** Molar conductance
  - c) Degree of dissociation
- (b) A current of 10 A is passed for 80 minutes and 27 seconds through a cell containing dilute sulphuric acid. How many moles of oxygen gas will be liberated at the anode? [2]

# **邑** ISC VERY SIMILAR SAMPLE PAPERS 邑 🛆

# Strictly as per latest syllabus 2023-2024

# The Complete Sample Paper Bundle (30 files) includes:

- \$\times 10 files (Question Papers only)
- \$\times 10 files (Solutions to Question Papers only)
- \$\times 10 files (Combined Questions and Answers- Instant Answers)

# **Special Features:**

- Detailed solutions to each question of all types
- Strictly aligned with the latest Syllabus (2023-2024)
- Very similar to the Specimen Paper 2024

# **Why Choose Our Resource?**

- Ready-to-Print Material
- Support and Guidance
- Downloadable
- Instant Availability

To buy Complete set of 10

To buy Papers With solutions,

Sample Papers 7099779727

Whats App

Interested? WhatsApp Us Now- 7099779727

