

RIZVI COLLEGE OF ARTS, SCIENCE AND COMMERCE

T.Y.B.Sc. CHOICE BASED (REGULAR 2023-24) SEMESTER-VI CHEMISTRY: PAPER V

(Time: 3 Hours)

Total Marks: 100

- N.B.: (1) All questions are compulsory.
 (2) Figures to the right indicate full marks.
 (3) Use of log table/ non-programmable calculator is allowed.

Q.1 Attempt any 4 out of 6 20M

- ✓ 1 What is structure activity relationship (SAR)? Explain SAR in sulphonamides.
- 2 Give the structure of curcumin and explain anti-infective properties of curcumin.
- ✓ 3 What is malaria? and what are the symptoms of malaria.
- ✓ 4 What is lead compound? How it is found by screening method and drug metabolism studies.
- 5 Give important uses of antibiotic which is used as chemotherapeutic agent.
- ✓ 6 Explain the various routes in excretion of drug.

Q.2 Attempt any 4 out of 6 20M

- 1 What are the characteristics of anti-TB drug.
- ✓ 2 Give the structure, characteristic properties, uses and side effects of Metronidazole and Ornidazole.
- 3 Explain briefly different forms of carbon nanoparticles.
- ✓ 4 Elaborate briefly the impact of pharmaceutical industries on environment.
- ✓ 5 What is drug intermediate and give the synthesis and use of 2,4,5-Triamino-6-hydroxy pyrimidine from guanidine.
- ✓ 6 What is cancer and what are its causes?

Q.3 Attempt any 4 out of 6 20M

- ✓ 1 Explain Nitro and Nitroso dyes with one example each.
- 2 Give an brief account on toxicity of the dye and intermediate.
- ✓ 3 Give the synthesis and use of Eriochrome black T
- ✓ 4 Explain briefly physical processes in the primary remediation of waste water.
- 5 Give the structure and uses of following dyes.
1) Orange IV 2) indigo 3)safranin-T
- ✓ 6 Give the synthesis and use of Auramine-O.

Q.4 Attempt any 4 out of 6 20M

- 1 What are the strength and opportunities for advancement of dyes stuff industry in India.
- ✓ 2 What are the duties and responsibilities of FDA and FSSAI.
- ✓ 3 Give a brief account of dyes used in food and cosmetics.
- 4 Give the characteristics of organic pigments.
- ✓ 5 Distinguish between dyes and pigment.
- 6 Give a brief account of dyes used in formulations.

Q.5A Multiple choice question (any 5 out of 8) 5M

- 1 Curcumin is the active component present in
A. Ginger B. Garlic C. Turmeric
- 2 The drugs are excreted through routes.
A. Lungs B. Milk C. Both A & B.

240420

SAC010624

RIZVI COLLEGE OF ARTS, SCIENCE AND COMMERCE

T.Y.B.Sc. CHOICE BASED (REGULAR 2023-24) SEMESTER-VI CHEMISTRY: PAPER V

- 3 The bacteria which retain the colour of crystal voile are called.....
A.Gram positive B.Gram negative C.Gram neutral
- 4 A derivative of lead compound is alwayspotent than the lead compound.
A.More B. Less C. Moderate.
- 5are drugs used for prophylaxis , treatment and prevention of relapses of malaria.
A. Antifungal B. Anti Helmentic C. Anti malarial.
- 6 Chemical agent which destroy pathogenic organisms to cure diseases are called
.....agent.
A.Reducing B. Chemotherapeutic C. Oxidizing.
- 7 In sulphonamides, the amino group and sulfonyl group on the benzene ring should be at
.....position.
A.Ortho B. Meta C. Para.
- 8 The process of chemical alteration of a drug *in vivo* is called drug.....
A. Toxicity B. Synthesis C. Metabolism.

(B) True or false (any 5 out of 7)

5M

- 1 Used of tinidazole cause increase in blood pressure.
2 Drug intermediates are used to prepare the drug.
3 Amoebiasis is caused by protozoan, E.histolytica.
4 Biomedical waste are not be mixed with the other waste
5 Coughing up blood in sputum is a symptom of tuberculosis.
6 fullerene is good conductor of electricity.
7 The study of nature, caused and cure of cancer is called oncology.

C Match the column (any 5 out of 8)

5M

- | | |
|--------------------------|-----------------------------------|
| 1. Secondary remediation | a. Having one or two hetero group |
| 2. FDA | b. Eriochrome black T |
| 3. Bis azo dyes | c. Oxidation |
| 4. Primary remediation | d. Food & Drug Administration |
| 5. Tris azo dyes | e. Sedementation |
| 6. Heterocyclic dyes | f. Congo red |
| 7. Tertiary remediation | g. Bioremediation |
| 8. Mono azo dyes | h. Contain three azo group |

D True and false (any 5 out of 7)

5M

- 1 The dye used to colour the tablets should be FDA/ FSSAI approved colour.
2 FSSAI is stands for Food safety and standard authority of India.
3 Pigments should be completely soluble in water as well as organic solvent
4 DNA markers are also known as genetic markers.
5 The security ink contain a single organic compound.
6 The availability of the land and water still a problem for dye-stuff industry in India.
7 The colour of the hair is due to coloured pigment called melanin.

03/04/24

[Time : 3Hours]

[Total marks :100]

N.B. : (1) All questions are compulsory.

(2) Figures to the right indicate full marks.

(3) Use of logarithmic table/non-programmable calculator is allowed.

Physical Constants:

$$N = 6.022 \times 10^{23}$$

$$c = 3.0 \times 10^8 \text{ m/s}$$

$$R = 8.314 \text{ J/K mol}$$

$$h = 6.626 \times 10^{-34} \text{ Js}$$

$$\frac{2.303 RT}{nF} = \frac{0.0592}{n} \text{ at } 298 \text{ K}$$

1. Attempt any four of the following:

- A. Define activity and activity coefficient of an electrolyte. Give the expression for activity of the following electrolytes 5
 i) AlCl_3 ii) CuSO_4 iii) Na_2SO_4
- B. Explain the function of the salt bridge. Why is a saturated solution of KCl generally used in preparation of salt bridge? 5
- C. Derive an expression for the e.m.f of an electrode concentration cell of the following cell 5
 $\text{Cd(Hg)}_{a_1} / \text{CdSO}_4(\text{aq}) / \text{Cd(Hg)}_{a_2}$
- D. Derive an expression for the e.m.f of an electrolyte concentration cell with transference reversible with anion 5
- E. Calculate the mean activity coefficient of NaCl in a solution containing 0.02 mol/dm^3 of NaCl and 0.05 mol/dm^3 of CaCl_2 ($A=0.509$ at 298K for water) 5
- F. Define hydrogen overvoltage. In the electrolysis of 2N sulphuric acid the hydrogen overvoltage at lead cathode was found to be 0.352V at 298 K for a given current density what will be the hydrogen overvoltage if the current density is increased six times its present value for the same cathode under the same conditions. (Given: $b = 0.12 \text{ V}$ at 298 K) 5

2. Attempt any four of the following.

- A. Explain the terms 5
 i) Monomer
 ii) Polydispersity Index
 iii) Degree of polymerization
- B. In a polymer sample 30% molecules have a molecular weight 20,000, 40% have molecular weight 30,000 and 30 % have 60,000. Calculate number average and weight average molecular weights for given polymer. 5
- C. Explain the classification of polymers on the basis of the structure. 5
- D. Explain the viscosity method for determination of molecular weight of polymers. 5
- E. Explain number average molecular weight and weight average molecular weight 5
- F. Describe advantages and applications of light emitting polymers. 5

3. Attempt any four of the following:
- A. Explain the Compton effect using Quantum mechanics and also give limitations of Classical mechanics in explaining it. 5
 - B. Find the eigen value and state whether the function is an Eigenfunction for then operator $\frac{d^2}{dx^2}$ for the following function. 5
 - i) $6\cos 4x$
 - ii) $3e^{5x}$
 - C. Write a note on: 5
 - i) Wave matter duality of matter
 - ii) Heisenberg Uncertainty Principle
 - D. What is a commutative operator? Explain and prove it with an example. 5
 - E. Discuss the classification of conductor, semiconductor and insulator on the basis of band gap. 5
 - F. Explain production of hydrogen gas using electrolysis of water and mention advantages of hydrogen gas as fuel. 5

4. Attempt any four of the following:
- A. Explain the working of NMR Spectrometer with the help of a neat labelled diagram 5
 - B. Derive the fundamental equation of NMR spectroscopy 5
 - C. Explain the relaxation processes in NMR spectroscopy. 5
 - D. Explain the principle of ESR spectroscopy 5
 - E. Draw diagram of ESR spectrometer and explain functions of following in ESR spectrometer i) Klystron oscillator ii) Sample cavity iii) Crystal detector 5
 - F. Explain fine splitting and hyperfine splitting of hydrogen ESR spectrum. 5

5. Answer the following:
- A. Select whether the following statements are true or false (Any five) 5
 - a. For a concentration cell, the standard emf of the cell is unity
 - b. Reduction involves the decrease in the oxidation state of the metal ion
 - c. The deviation of an electrolyte solution from its ideal behaviour is called as activity
 - d. A plot of log of mean activity coefficient versus square root of ionic strength gives a positive slope
 - e. The value of liquid junction potential depends on the volume of the electrolyte in a galvanic cell
 - f. The minimum external potential that must be applied between electrodes in an electrolytic solution to bring continuous electrolysis is called as decomposition potential
 - g. The cause of polarization phenomenon in an electrolytic cell is due to back emf
 - h. Overvoltage is dependant on temperature

- B. Fill in the blank with appropriate words (Any five) 5
 - a. ----- is an example of natural polymer (nucleic acid, PVC, Rayon, polyester)
 - b. Thermoplast are the polymers which soften when heated and _____ when cooled. (brittle, harden, blackned, colourless)

- c. Weight average molecular weight is defined by symbol _____
($\overline{M}_n, \overline{M}_w, \overline{M}_z, \overline{M}_v$)
- d. Heating rubber with sulphur is called _____
(Galvanization, Vulcanization, Sulphonation, Bessmerisation)
- e. Which is a naturally occurring polymer _____
(polythene, protein, PVC, Polypropylene)
- f. In linear polymers monomeric units are _____ together (break up, branched, cross linked, linked)
- g. PVC is an example of _____ polymer
(inorganic, organic, bio-organic, natural)

C. Select and write the appropriate answer. (Any five)

5

- a. According to Quantum mechanics, ejection of electrons from metal in Photoelectric effect is dependant on _____ of the radiation
a) Intensity b) Frequency c) temperature
- b. In Black body radiation as temperature of the body increases, _____ of the emitted radiation
a) wavelength and intensity increase
b) wavelength and intensity decrease
c) wavelength decreases, intensity increases
- c. The wave function defined for a system has to be _____
a) single valued b) infinite c) discontinuous
- d. Which of the following is not correct about standing waves?
a) amplitude vary with time b) confined in a space c) Do not propagate
- e. If operator satisfies, $\hat{A} [f(x) + g(x)] = \hat{A} f(x) + \hat{A} g(x)$, operator is said to be —
a) commutative b) linear c) harmonic
- f. Which of the following is a nonrenewable source of energy?
a) Tidal b) CNG c) Solar
- g. A solar cell works on the principle of
a) Photovoltaic effect b) Photoelectric effect c) Thermoelectric effect
- h. Which of the following is an advantage in using hydrogen as a future fuel?
a) transportation b) high calorific value c) storage

D.

Match the column:

(Any five)

5

Column A

Column B

- | | |
|------------------------------------|--------------------------------|
| a. C_{12}^6 | i. 2.0023 |
| b. Precessional angular frequency | ii. $j = 1/2$ |
| c. Degenerate energy level | iii. Tetramethylsilane(TMS) |
| d. D_7^2 | vi. CO |
| e. N_7^{15} | v. $I = 1$ |
| f. g value of free electron in ESR | vi. Absence of magnetic field |
| g. Reference compound in NMR | vii. 2.2003 |
| | viii. $I = 0$ |
| | ix. Presence of magnetic field |
| | x. $I = \frac{3}{2}$ |

[Time: 3 Hours]

[Total marks :100]

N.B.: (1) All questions are compulsory.

(2) Figures to the right indicate full marks.

(3) Use of logarithmic table/non-programmable calculator is allowed.

1. Attempt any four of the following:
 - A. What is crystal field splitting? Explain with reference to tetrahedral complexes. 5
 - B. Explain the following factors affecting crystal field splitting. 5
 - i] Nature of the ligands.
 - ii] position of metal in transition series.
 - C. Explain the term crystal field stabilization energy [CFSE]. Calculate CFSE for d^8 and d^9 configurations in strong field octahedral complexes. 5
 - D. Discuss any five merits of crystal field theory. 5
 - E. Explain Jahn-Teller distortions in octahedral complexes with suitable example. 5
 - F. Write a note on intensity of d-d transition as an evidence of covalent bonding in metal complex. 5

2. Attempt any four of the following:
 - A. Discuss molecular orbital diagram of $[\text{Fe}(\text{H}_2\text{O})_6]^{3+}$ complex and give its magnetic behaviour. 5
 - B. Write a note on Steric effect on the stability of metal complexes. 5
 - C. Explain charge transfer transitions in metal complexes. 5
 - D. Write a note on S_N1 mechanism in ligand substitution reaction of octahedral metal complexes. 5
 - E. Distinguish between thermodynamic and kinetic stability in metal complexes. 5
 - F. Write a note on base hydrolysis in ligand substitution reaction of octahedral metal complexes. 5

3. Attempt any four of the following:
 - A. Define organometallic compound. Write a note on multicentred electron deficient organometallic compound. 5
 - B. Describe the method of preparation of organometallic compound by oxidative addition reaction. 5
 - C. Write a note on Complex formation reactions of organometallic compounds. 5
 - D. What is ferrocene? Explain structure of ferrocene according to valence bond theory. 5
 - E. Write a note on any five chemical reactions of ferrocene. 5
 - F. Differentiate between homogeneous and heterogeneous catalysis. 5

4. Attempt **four** of the following:
- Define metallurgy. Explain Hydrometallurgy with suitable example. 5
 - What are the different methods used for concentration of ore? Discuss in detail Hydraulic Classifier Method. 5
 - Write the steps involved in extraction of copper. Explain the electrolytic refining of copper. 5
 - How are noble gases isolated by Charcoal Adsorption methods. 5
 - Give the method of preparation and structure of following compound on the basis of VSEPR Theory: 5
 - XeF_6
 - D_3
 - Write note on importance of sodium potassium ion pump in biological system. 5

5. Answer the following:

- A. Select the correct option and complete the following statements: (any five) 5
- CFSE for strong field octahedral complexes with d^5 configuration is -----

a) $-6+4P$ b) $-12Dq+3P$ c) $-24Dq+3P$ d) $-20Dq+2P$
 - In octahedral complex, d-orbital of central metal degenerates into ----- energy levels
a) 1 b) 3 c) 4 d) 2
 - Jahn-Teller distortions are more common among the octahedral complexes with ----- distribution of electrons.
a) proportional b) symmetric c) asymmetric d) equal
 - Crystal field splitting energy in square planar complex is denoted as -----
a) Δ b) Δ_{sp} c) Δ_q d) Δ_o
 - is a strong field ligand.
a) S^{2-} b) Cl^- c) CO d) F^-
 - In transition metal complexes, d-orbitals of the metal are affected by -----

a) M^{n+} b) Co-ions c) Ligands d) cations.
 - Colour observed for a complex is ----- to the colour that is absorbed.
a) same b) complimentary c) alike d) identical
 - Electron spin resonance spectra of $[\text{IrCl}_6]^{2-}$ shows ----- curve
a) Double hump b) smooth c) Serrated d) linear
- B. State whether true or false: (any five) 5
- $[\text{Ti}(\text{O})_6]^{3-}$ is low spin complex. 5
 - Number of microstates for p^1 configuration is 21.
 - ΔE for this transition is Laporte allowed.
 - Ground state term for $1s^1$ is 2S .
 - Complexes with polydentate ligands are more stable than those with unidentate ligands.
 - Associative mechanism for ligand substitution reaction forms seven coordinate intermediate with pentagonal bipyramidal structure.
 - $2S+1$ is called spin multiplicity.

- C. Fill in the blanks with correct alternatives given in the bracket : (any five) 5
 (M – C, increases, CH_3MgCl , oxidation, heterogeneous, reductive elimination, 2 C_5H_6 , Mannich.)
- The essential requirement for an organometallic compound is the presence of at least one bond
 - In preparation of organometallic compound by oxidative addition reaction, oxidation number of metal
 - is the example of organometallic compound.
 - Condensation of ferrocene rings with formaldehyde and amine is called as reaction.
 - During nitration ferrocene undergoes
 - $\text{Fe} + \dots \rightarrow (\text{C}_5\text{H}_5)_2\text{Fe} + \text{H}_2$
 - When the reactants and catalyst are in the different phase, catalyst is referred as
 - High formal positive charge on the metal and presence of bulky groups on the molecule, facilitates reactions.

- D. Match the column: (Any five) 5
- | Column A | Column B |
|-----------------------|-----------------------------------|
| a. Grinding | i. Source of β radiation |
| b. Frothing agent | ii. Incandescent electric bulbs |
| c. Acidic impurities | iii. Iron Deficiency |
| d. Bessemerisation | iv. Source of α radiation |
| e. Krypton Clathrates | v. Pulverization |
| f. Argon | vi. Skin pigmentation |
| g. Anaemia | vii. Pine oil |
| h. Tryosinase | viii. Used in treatment of cancer |
| | ix. Blister Copper |
| | x. Basic Flux |
-

[Time: 3 Hours]

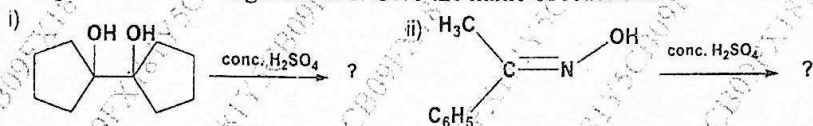
[Marks: 100]

- All questions are compulsory.
- All questions carry equal marks.
- Figures to the right indicate full marks.
- Use of log table/ non-programmable calculator is allowed.

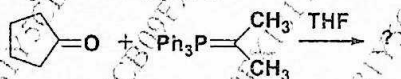
- Q.1 Attempt any four of the following.** 20
- A) Explain with mechanism the addition of bromine to but-2-ene is both stereospecific and stereoselective reaction? 5
- B) A chiral alcohol reacts with thionyl chloride. Write the reaction and its mechanism. Explain the stereochemistry involved in it. 5
- C) Explain the stereochemistry of KMnO_4 oxidation of maleic acid and fumaric acid. 5
- D) Define Topicity. Explain the following with one example: 5
- Enantiotopic ligands
 - Diastereotopic ligands
- E) a) Explain isoelectric point with respect to α -amino acids. 3
- b) Give preparation of alanine by Strecker synthesis. 2
- F) Explain in detail the preparation of a tripeptide by using the Merrifield solid phase peptide synthesis? 5

- Q.2 Attempt any four of the following.** 20

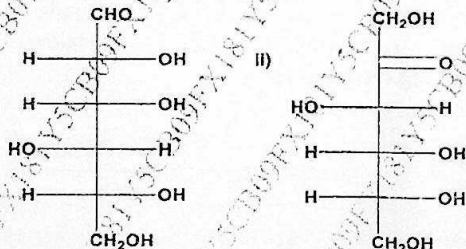
- A) What is Favorskii rearrangement? Explain with suitable example. 5
- B) a) Complete the following reactions. Give the name of reactions. 3



- b) Complete the reaction. 2



- C) a) Explain reducing and non-reducing sugars with suitable examples. 3
- b) Write appropriate reactions for acetylation of α -D-glucopyranose. 2
- D) Convert the following Fischer projection formula to Haworth formulae. (β -furanose forms) 5

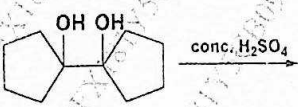
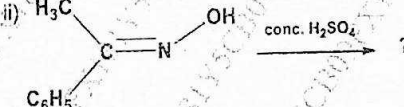
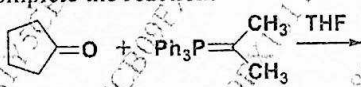
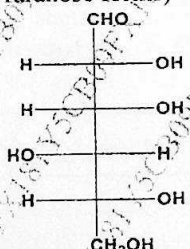
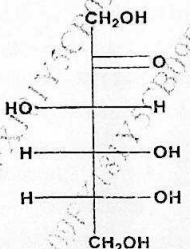


- E) a) Write the reactions for complete methylation of α -D-glucopyranose in a stepwise manner. 3
- b) Draw chair conformations of α and β forms of D-glucopyranose. 2
- F) a) How will you convert D-Glucose into D-Arabinose 3
- b) Write the reactions for oxidation of D-glucose using: 2
- Bromine water
 - Conc: HNO_3

[Time: 3 Hours]

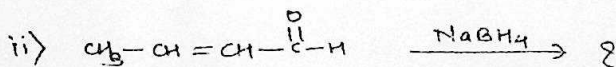
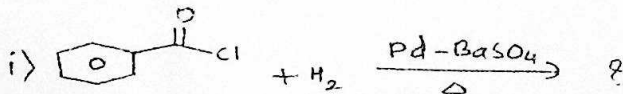
[Marks: 100]

- All questions are compulsory.
- All questions carry equal marks.
- Figures to the right indicate full marks.
- Use of log table/ non-programmable calculator is allowed.

- Q.1** Attempt any four of the following. 20
- A) Explain with mechanism the addition of bromine to but-2-ene is both stereospecific and stereoselective reaction? 5
- B) A chiral alcohol reacts with thionyl chloride. Write the reaction and its mechanism. Explain the stereochemistry involved in it. 5
- C) Explain the stereochemistry of KMnO_4 oxidation of maleic acid and fumaric acid. 5
- D) Define Topicity. Explain the following with one example: 5
- Enantiotopic ligands
 - Diastereotopic ligands
- E) a) Explain isoelectric point with respect to α -amino acids. 3
- b) Give preparation of alanine by Strecker synthesis. 2
- F) Explain in detail the preparation of a tripeptide by using the Merrifield solid phase peptide synthesis? 5
- Q.2** Attempt any four of the following. 20
- A) What is Favorskii rearrangement? Explain with suitable example. 5
- B) a) Complete the following reactions. Give the name of reactions. 3
- 
 - 
- b) Complete the reaction. 2
- 
- C) a) Explain reducing and non-reducing sugars with suitable examples. 3
- b) Write appropriate reactions for acetylation of α -D-glucopyranose. 2
- D) Convert the following Fischer projection formula to Haworth formulae. (β -furanose forms) 5
- 
 - 
- E) a) Write the reactions for complete methylation of α -D-glucopyranose in a stepwise manner. 3
- b) Draw chair conformations of α and β forms of D-glucopyranose. 2
- F) a) How will you convert D-Glucose into D-Arabinose 3
- b) Write the reactions for oxidation of D-glucose using: 2
- Bromine water
 - Conc. HNO_3

- Q.3. Attempt any four of the following.** 20
- A) Explain how IR spectrum is used to determine the following: 5
1. If the given compound is aromatic.
 2. The two given compounds are identical
- B) a) Explain the effect of magnetic anisotropy on aldehydic protons? 3
 b) What is chemical shift? How is it expressed? 2
- C) a) Give the structure of the following pyrimidine bases present in nucleic acid? 3
1. Cytosine
 2. Uracil
 3. Thymine
- b) Draw the structure of sugars present in DNA & RNA. 2
- D) a) Explain the controlled hydrolysis of nucleic acids. 3
 b) What are nucleosides? Draw the structure of Adenosine. 2
- E) An organic compound has the molecular formula C_4H_8O . Determine the index of its hydrogen deficiency and deduce its structural formula from the following spectral data: 2
- IR spectrum: It shows a sharp band at 1740 cm^{-1}
 PMR spectrum: It shows a doublet at $\delta\ 1.1\text{ ppm}$ (6H), multiplet at $\delta\ 2.3\text{ ppm}$ (1H) and a doublet at $\delta\ 9.4\text{ ppm}$ (1H).
- F) An organic compound has the molecular formula M.F. $C_8H_{10}O$. Determine the index of its hydrogen deficiency and deduce its structural formula from the following spectral data. 5
- IR Spectrum (cm^{-1}): 3500, 1600, 1570, 760 & 710.
 PMR Spectrum (in $\delta\text{ ppm}$): 1.6 (3H,d), 4.9 (1H,q), 7.4 (5H,m), 4.2 (1H,s, D_2O exchangeable). Suggest a structure for the compound and justify your answer.

- Q.4 Attempt any four of the following.** 20
- A) a) What is Ziegler-Natta catalyst? Explain the stereoisomerism taking example of polypropylene. 3
 b) Give the preparation and uses of PVC. 2
- B) a) Explain the following terms with example: 3
- i) Elastomers
 - ii) Fibres
 - iii) Plasticiser
- b) Give any two biomedical uses of synthetic polymers. 2
- C) a) Give the structure, properties and uses of polyurethane. 3
 b) Write a note on vulcanisation of rubber. 2
- D) How is Raney-Ni prepared? Write its reduction reactions with following compounds? 2
- i) Alkenes
 - ii) Nitriles
 - iii) Nitro compounds
- E) a) What is the action of $LiAlH_4$ on the following compounds: 3
- i) Acetone
 - ii) Methyl cyanide
 - iii) Nitro ethane
- b) Complete the following reactions



- F) a) What is epoxidation? What is the reagent used. Explain the selectivity in the reaction with a suitable example. 3
 b) Write any two uses of SeO_2 . 2

- Q.5 A)** Select the correct option and complete the following statements: (any five) 5
- A carbon atom, to which enantiotopic ligands are attached, is called.....
 - Chiral centre
 - Prochiral centre
 - Ei mechanism
 - None of above
 - The stereochemical equivalence or non-equivalence of different atoms or groups in a molecule is called.....
 - Topocity
 - Distereoselectivity
 - Enantioselectivity
 - Stereoselectivity
 - S_N1 reaction proceeds via..... of configuration.
 - Retention
 - Inversion
 - Racemization
 - None of above
 - Meso tartaric acid has.....
 - Plane of symmetry
 - Centre of symmetry
 - Alternating axis of symmetry
 - None of above
 - Hydroxylation of alkene by $KMnO_4$ is..... reaction.
 - Stereoselective
 - Stereospecific
 - Stereoselective and Stereospecific
 - None of above
 - The $-CO-NH-$ linkage is called.....
 - Peptide bond
 - Aminine bond
 - Aldehyde bond
 - Ketone bond
 - is used in Strecker synthesis.
 - K-phthalimide
 - Phthalimide
 - Aldehyde
 - Phenyl hydrazine
 - The amino acids which are synthesized by human body are called..... α -amino acids:
 - Essential
 - Non-essential
 - Acidic
 - Basic

- Q.5 B)** State whether true or false: (any five) 5
- D-glucose and D-galactose are epimers.
 - Alkyne is the product of Wittig reaction.
 - Beckmann rearrangement of ketoximes is stereospecific.
 - Pinacol rearrangement takes place in presence of base catalyst.
 - Glucose is a ketose.
 - Five moles of periodic acid are required per mole of D-Fructose.
 - Cellulose is a polysaccharide.

- Q.5 C)** Fill in the blanks with correct alternatives given in the bracket: (any five) 5
- (out-of-plane bending, deshielding, $1690-1720\text{ cm}^{-1}$, polyphosphate chain, solvent, RNA, $3200-3600\text{ cm}^{-1}$, cytoplasm, in-plane bending, three, standard, nucleus.)
- Carbon-tetrachloride is used as a ----- in PMR spectroscopy.
 - helps in protein synthesis.
 - DNA is found in the ----- of the cell.
 - The backbone of nucleic acid molecule is a -----.
 - A broad absorption band due to $-O-H$ stretching in alcohols appears in the region around -----.
 - For water molecule the number of possible modes of vibrations is ----.
 - The presence of electron withdrawing groups causes ----- effect on the adjacent protons..
 - Rocking is a type of ----- vibration.

Q.5 D) Match the columns: (any five)

Column A	Column B
a) Stabilizers	(i) Cold rubber.
b) Buna-S rubber	(ii) Chemoselective oxidising agent
c) Neoprene	(iii) CaO
d) PHBV	(iv) Allylic or benzylic bromination
e) Lindlar's catalyst	(v) Elastomers
f) Adam catalyst	(vi) Chloroprene.
g) NBS	(vii) Biodegradable polymer
	(viii) Partially reduction of alkynes
	(ix) PtO_2

08/04/24 TYBSC - VI

(Time: 3 hours)

Total Marks: 100

- N.B.: (1) All questions are compulsory.
 (2) Figures to the right indicate full marks.
 (3) Use of log table/ non-programmable calculator is allowed.

- Q.1** Attempt any four of the following. 20
- A) (a) What is a polarogram? Draw a polarogram and label all the different regions.
 (b) Explain half wave potential and its significance.
- B) Explain the construction and working of dropping mercury electrode with a neat labelled diagram.
- C) Explain the term polarographic maxima with a neat diagram. How is it eliminated?
- D) A 5×10^{-4} M solution of Ba^{2+} ion in 0.1 M KCl as a supporting electrolyte gave a diffusion current of $4.1 \mu\text{A}$. If the rate of flow of mercury drops and the drop time is 1.5 mgs^{-1} and 3 second respectively. Calculate diffusion coefficient of Ba^{2+} ion.
- E) Explain the nature of amperometric titration curves when,
 i) titrant is reducible but other species are not.
 ii) both titrant and titrand are reducible.
- F) Draw a labelled diagram of rotating platinum electrode.
 Give the advantages and limitations of amperometric titrations.

- Q.2** Attempt any four of the following. 20
- A) Explain the following terms: i) retention time ii) retention volume
- B) Draw a neat and labelled schematic diagram of gas-liquid chromatography. Give any three requirements of carrier gas.
- C) Name the detectors used in gas chromatography. Explain any one detector with the help of a labelled diagram.
- D) What are ion exchange resins? What are the requirements of a good ion exchange resin?
- E) If the two separated components A and B have retention times 4.45 min. and 6.36 min. respectively. If the peak widths at half peak heights of A and B are 0.22 min. and 0.33 min. respectively. Calculate the number of theoretical plates for each peak.
- F) With reference to ion exchange chromatography explain the following applications-
 1) Demineralisation of water
 2) Separation of Amino acids

- Q.3.** Attempt any four of the following. 20
- A) Explain the physical method of food preservation with reference to
 (i) Pasteurisation
 (ii) Irradiation
- B) Give the composition of milk. Discuss the nutritive value of milk.
- C) Explain the Lowenthal's method to estimate tannin in tea.
- D) Give the composition of Coffee. What is the role of chicory in Coffee?

- E) Give the constituents of Face Powder. What are the characteristics of Face Powder?
- F) What are cosmetics? Give the differences between deodorant and antiperspirant.

Q.4

Attempt any four of the following.

20

- A) Give the applications of thermogravimetry.
- B) Draw a neat and labelled diagram of thermobalance. Discuss any three components of it.
- C) Explain the principle of DTA. Discuss DTA curve of $\text{CaC}_2\text{O}_4 \cdot \text{H}_2\text{O}$ with respect to curve, reactions and decomposition temperature.
- D) Give the characteristics of reference material used in DTA. Mentioned name of any four reference materials used in DTA.
- E) Define thermometric titration. Discuss the thermometric titration for Complexometric titration in determination of Calcium and Magnesium
- F) Discuss any five parameters used in method validation process.

Q.5

A) Select the correct option and complete the following statements: (any five) 05

- a) The electrode which has its own potential and cannot take up potential applied on it is called ____.
- i) dropping mercury electrode ii) non-polarizable electrode iii) rotating platinum electrode
- b) In polarography, KCl is used to ____ migration current.
- i) Eliminate ii) increases iii) maintain
- c) The potential at the point on the polarography wave where $i = i_d/2$, is termed as ____.
- i) Half wave current ii) Half wave potential iii) decomposition potential
- d) ____ is directly proportional to the concentration of metal ion.
- i) Diffusion current ii) Residual current iii) limiting current
- e) ____ is used as maxima suppressor in polarography.
- i) KCl ii) Gelatin iii) Pool of mercury
- f) Rotating platinum is used in amperometric titration as ____ electrode.
- i) reference ii) working iii) combined
- g) In amperometric titration of Zn^{2+} determined by titrating with ____.
- i) dimethyl glyoxime ii) silver nitrate iii) EDTA
- h) When titrand is reducible but titrant and product are not in amperometric titration shows ____.
- i) constant current till the equivalence point, then increases.
ii) decrease in current till the equivalence point, then constant
iii) increase in current till the equivalence point, then decreases

- Q.5 B) State whether true or false: (any five) 05**
- Separation of components in gas-liquid chromatography occurs by differential adsorption.
 - The choice of the detector does not depend on the carrier gas.
 - The smaller the magnitude of plate height, the higher is the efficiency of the column.
 - The response of the detector in gas chromatography should be linear.
 - An anion exchanger contains a carboxylic functional group.
 - Styrene on polymerization produces linear polymers.
 - The unit of ion exchange capacity is milliequivalent/gm.

- Q.5 C) Fill in the blanks with correct alternatives given in the bracket: (any five) 05**
(glucose oxidase, 63°C and 72°C, Lipstick, magnesium silicate, quality, deodorant, methylene blue, irradiation)
- Food processing improves the _____ value of food.
 - Raw honey contains the enzyme _____
 - _____ prevents/controls body odour.
 - _____ is a physical method of food preservation.
 - Pasteurization of milk is carried out at _____
 - For determination of reducing sugars in honey, by Cole's ferricyanide method _____ is used as an internal indicator.
 - _____ mainly consists of an oily base material and colouring agent
 - Chemically talc is _____

- Q.5 D) Match the columns: (any five) 05**
- | A | B |
|--------------------------------|---|
| i) Thermometric titration | (a) ΔT plotted against sample temperature |
| ii) Thermogravimetric analysis | (b) Closeness of obtained value to true value |
| iii) Double pan used | (c) Reference standard |
| iv) Accuracy | (d) Exotherm |
| v) DTA curve | (e) Weight change measurements |
| vi) MgO | (f) Adiabatic condition |
| vii) Air oxidation | (g) DTA |
