D–1494

Sub. Code
34411

DISTANCE EDUCATION

M.Sc. (Chemistry) DEGREE EXAMINATION,
DECEMBER 2025.

First Semester

INORGANIC CHEMISTRY – I

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Write key characteristics of Multi-Center Bonding.

2. Ammonia is a base but does not contain a hydroxyl group.

3. Explain the concept of hybridization.

4. Dry hydrogen chloride gas does not turn blue litmus red whereas dilute hydrochloric acid does.

5. List out the various uses of Silicates.

6. Write short notes on Feldspar.

7. What are Heteropoly Acids?

8. How does a metal excess defect occur in metal oxide crystals?

9. How are the Ni^{2+} ions arranged in the structure of nickel arsenite?

10. What is the radius ratio rule in crystal structures?

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Explain the bonding in carbon monoxide (CO) using molecular orbital theory.

Or

(b) Discuss the different types of Intermolecular forces and their effect on the physical properties of substances.

12. (a) Explain the concept of multi-center bonding with suitable examples.

Or

(b) Explain the Key Factors Influencing Acid-Base Strength.

13. (a) What are different types of overlapping?

Or

(b) How are isopoly acids classified? Explain the structure of polytungstate.

14. (a) Illustrate the differences between Graphite and Diamond.

Or

(b) Explain the structure of cdl_2 and nickel arsenite.

15. (a) Explain the concept of F-centers in ionic crystals.

Or

(b) Describe the structure and application of Zeolites.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Explain the shapes of molecules by using VSEPR theory.

17. Discuss the factors affecting lattice energy and how it influences the solubility and Stability of ionic compounds.

18. How are silicates classified? Give structure for each type.

19. Describe in detail about various types of heteropolyacids and its synthesis.

20. Explain the structures of Ax and Ax_2.

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D–1495

Sub. Code
34412

DISTANCE EDUCATION

M.Sc. (Chemistry) DEGREE EXAMINATION,
DECEMBER 2025.

First Semester

ORGANIC CHEMISTRY – I

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Write structural formulae and IUPAC names of the following compounds

   (a) Dimethyl carbinol

   (b) Ethylidene chloride

   (c) Crotonic acid

   (d) Vinyl acetylene.

2. What are fullerenes? Describe its types.

3. Write the applications of hydrogen bonding.

4. Define atropisomerism with examples.

5. Explain the optical activity in allenes.

6. Discuss about isotope labelling.

7. Write a short note on Curtin-Hammett principle.

8. What is molecular rearrangement?

9. Explain the aliphatic substitution reaction of Grignard with halogen.

10. Represent the halogenation of aldehydes.

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) State the theory of resonance.

Or

(b) Discuss aromaticity on larger annulenes.

12. (a) Discuss the Cram's and Prelog's rules for asymmetric synthesis.

Or

(b) Explain the conformation in decalins.

13. (a) Explain the conformation of butane in detail.

Or

(b) Differences between enantiomers and diastereomers. Give suitable examples.

14. (a) Discuss the reaction and mechanism of Beckman rearrangement.

Or

(b) What are classical and non-classical carbocations? Give suitable examples.

15. (a) Give a detailed note on aromatic electrophilic substitution reactions.

Or

(b) List out the various factors that affect aliphatic substitution reactions.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. (a) Explain molecular orbital theory with suitable example. (5)

(b) Give a concise account of systematic nomenclature of organic compounds. Discuss the IUPAC system of naming organic compounds. (5)

17. (a) Write a brief note on the substitution reactions in free radicals. (5)

(b) Give the mechanism and two examples for Gomberg reaction. (5)

18. Discuss the structure and stability of carbocations.

19. Explain the factors affecting S_N1 and S_N2 reaction.

20. (a) List the factors that affect aromatic electrophilic substitution reactions.

(b) Explain the reaction and mechanism of Friedel-Crafts alkylation of benzene.

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D–1496

Sub. Code
34413

DISTANCE EDUCATION

M.Sc. (Chemistry) DEGREE EXAMINATION,
DECEMBER 2025.

First Semester

PHYSICAL CHEMISTRY – I

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. Define entropy.

2. State Nernst heat theorem.

3. Define fugacity.

4. What do you mean by the term ionic mobility?

5. Define electrode potential.

6. What are linear operators?

7. State Heisenberg's uncertainty principle.

8. What are eigen functions?

9. State the principle of steady state approximation.

10. Give two examples for III order reaction.

PART B — (5 × 5 = 25 marks)

Answer ALL the questions, choosing either (a) or (b).

11. (a) Write the differences between reversible and irreversible processes.

Or

(b) Derive the expression for Gibb's free energy function.

12. (a) Write any two applications of emf measurements.

Or

(b) Discuss the construction and working of standard hydrogen electrode.

13. (a) Discuss the applications of conductivity measurements.

Or

(b) Write a note on partial molar quantities.

14. (a) Formulate the mathematical expression for linear momentum operator.

Or

(b) Explain the phenomenon of photo electric effect.

15. (a) Discuss the Lindemann theory for unimolecular reaction.

Or

(b) Discuss the kinetics of parallel reaction.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. (a) Discuss about the various steps involved in the working of Carnot engine. (7)

(b) State the relationship between activity and activity coefficient. (3)

17. (a) Derive the Butler-Volmer equation for electrode kinetics. (5)

(b) Mention the applications of Debye-Huckel-onsagar equation. (5)

18. (a) Derive the expression for Duhem Margules equation. (5)

(b) Write a note on kinetic isotopic effect. (5)

19. (a) Derive the expression for Schrodinger wave equation. (5)

(b) Illustrate how degeneracy in energy states are originated in a three dimensional box. (5)

20. (a) Explain the elements of ARR theory. (7)

(b) Write a note on chain reactions. (3)

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D–1497	Sub. Code
	34421

DISTANCE EDUCATION

M.Sc. (Chemistry) DEGREE EXAMINATION,
DECEMBER 2025.

Second Semester

INORGANIC CHEMISTRY – II

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Give the limitations of Valence Bond Theory.

2. What is Jahn-Teller distortion?

3. Mention the factors affecting nuclear stability.

4. Define Half-life period.

5. What is nuclear fusion? Give example.

6. List out the uses of Charged particle accelerators.

7. What is Cyclotron?

8. Define transmutation.

9. Mention the uses of actinides.

10. What is Lanthanide Contraction?

SECTION B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Describe definition and Postulates of Valence bond Theory.

Or

(b) Explain Molecular Orbital Theory of Octahedral Complexes.

12. (a) Write a note on Para and diamagnetism with suitable example.

Or

(b) Explain Crystal field Theory in Square planar complexes.

13. (a) Discuss Meson field Theory in nuclear chemistry.

Or

(b) Write a note on various modes of radioactive decay.

14. (a) Compare nuclear fission and nuclear fusion with example.

Or

(b) What is neutron activation analysis? Give its Principle, Procedure and applications.

15. (a) Discuss the separation of Lanthanides by solvent extraction technique.

Or

(b) Explain the Spectral properties of Lanthanides and actinides.

SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Explain the Crystal field theory in octahedral and tetrahedral complexes.

17. Discuss the theory of coordination in tetrahedral and square planar complexes using Molecular Orbital Theory.

18. Write a note on Geiger muller counter and scintillation counter.

19. Describe the applications of C^{14} dating in agriculture and biology.

20. Write a note on the following :

    (a) Selective reduction and oxidation. (5)

    (b) Uses of actinides. (5)

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D–1498	Sub. Code
	34422

DISTANCE EDUCATION

M.Sc. (Chemistry) DEGREE EXAMINATION,
DECEMBER 2025.

Second Semester

ORGANIC CHEMISTRY – II

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Define Saytzeff rule with suitable example.

2. Discuss the significance of Bredt's rule.

3. Write Wittig reaction with one example.

4. Write the staggered Newmann projection form of n-butane

5. Write the addition reaction of singlet carbene with (*Z*)-but-2-ene.

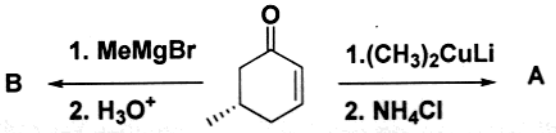
6. Explain Barton reaction with suitable example.

7. Define quantum efficiency.

8. What is the major product formed in the following reactions?

9. Explain why *trans*-decalin cannot flip?

10. What is the major product formed in the following reactions?



PART B — (5 × 5 = 25 marks)

Answer ALL the questions, choosing either (a) or (b).

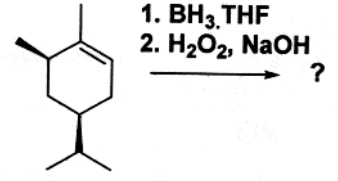
11. (a) The reaction of Neomenthyl chloride is 200 times faster than menthyl chloride with sodium ethoxide. Explain.

Or

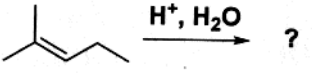
(b) Differentiate regioselective and chemoselective addition reactions with suitable examples.

12. (a) Write the major product formed in the following reactions. (2 + 1 + 2)

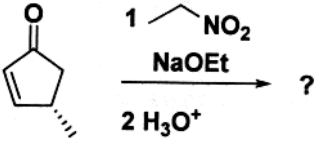
(i)



(ii)



(iii)



Or

(b) Explain the conformational stability of cyclohexane with energy profile diagram.

13. (a) Write any three methods for generation of nitrene.

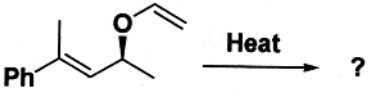
Or

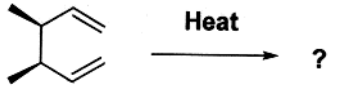
(b) Discuss the Hoffmann degradation with detail mechanism.

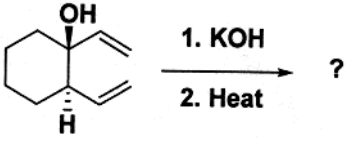
14. (a) Explain Di-π-methane rearrangement with suitable example.

Or

(b) Find the major product formed in the following reactions. (2 + 2 + 1)

(i) 

(ii) 

(iii) 

15. (a) Explain the FMO theory of photochemical electrocyclic ring closing reaction of (2E, 4E)-hexa-2, 4-diene.

Or

(b) Discuss the NMR distinction of diastereotopic ligands with suitable examples

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Explain the pyrolytic syn elimination with suitable examples.

17. (a) Discuss the reaction and mechanism of Reformatsky reaction. (5)

(b) Explain various types of allylic strain with examples. (5)

18. (a) Discuss the stability of carbene with suitable example. (5)

(b) Write the Hunsdiecker reaction with suitable examples. (5)

19. Write a detail notes on Jablonski diagram.

20. (a) Explain the thermal reaction of ozone with 2, 3-dimethyl butene. (5)

(b) Explain the stereochemical outcome of the witting reaction with example. (5)

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D–1499

Sub. Code
34423

DISTANCE EDUCATION

M.Sc. (Chemistry) DEGREE EXAMINATION,
DECEMBER 2025.

Second Semester

PHYSICAL CHEMISTRY – II

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Define the term physical adsorption.

2. Write the Temkin adsorption isotherm equation.

3. What are micelles? Give an example.

4. Define fluorescence.

5. What is the role of a photosensitizer in photochemistry?

6. Define quantum yield.

7. What is an initiator in polymerization?

8. Define degree of polymerization.

9. What are colloids? Give two examples.

10. Mention two applications of photovoltaic cells.

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Explain about Freundlich adsorption isotherms.

Or

(b) Discuss the concepts of Langmuir-Hinshelwood mechanism.

12. (a) Explain the importance of bimolecular surface reactions.

Or

(b) Explain the determination of quantum yield in a photo chemical reaction.

13. (a) Discuss the various steps involved in anionic polymerization process.

Or

(b) Write differences between addition and condensation polymerization process.

14. (a) Write a note on the classification of colloids.

Or

(b) What are dendrimers? Mention its applications.

15. (a) Explain the working of photovoltaic cells.

Or

(b) Describe the concept of artificial photosynthesis.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. (a) Differentiate physical and chemical adsorption processes. (5)

(b) Derive Langmuir adsorption isotherm. (5)

17. (a) Discuss the process of chemiluminescence. (5)

(b) Write a note on flash photolysis. (5)

18. Explain in detail about bulk and emulsion polymerization.

19. (a) Describe the principle of dye-sensitized solar cells. (5)

(b) Explain the hydrogen evolution reaction with a neat diagram. (5)

20. (a) Give account on conducting polymers. (5)

(b) Discuss the kinetics of free radical polymerization. (5)

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D–1500	Sub. Code
	34431

DISTANCE EDUCATION

M.Sc. DEGREE EXAMINATION, DECEMBER 2025.

Third Semester

Chemistry

ADVANCED INORGANIC CHEMISTRY

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. Give example for Electron transfer reaction.

2. Write any two advantages of template effect.

3. State Wades rule.

4. Define 18-electron rule.

5. Calculate the number of bridged and terminal CO ligands present in $OS_3(CO)_{12}$

6. How will you synthesis metal aryls complexes.

7. Give two examples for acetylene complexes.

8. Draw the structure of Rubridoxin.

9. What are the advantages of enzyme action?

10. What are the uses of chelating agents in medicine?

PART B — ($5 \times 5 = 25$ marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Determine the stability constant by spectrophotometric methods with suitable Example.

Or

(b) Discuss substitution reaction in square planar complexes

12. (a) Illustrate various advantages of trans effect.

Or

(b) Define the term spinels? How is it classified? Explain.

13. (a) What are metal clusters? How are they classified? Explain in detail.

Or

(b) What are metal nitrosyls? Explain their preparation and properties.

14. (a) Illustrate the Dewar-Chatt approach to bonding in olefins.

Or

(b) Comments on the structure of ferrocene?

15. (a) Discuss about structure and function of vitamin B_{12}.

Or

(b) List out the uses of alkali and alkaline earth metal ions in biology.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Explain ligand displacement reactions with suitable examples.

17. Discuss the preparation, chemical reactivity and structure of borane compounds.

18. (a) Illustrate about two set of energy level Orgel diagram.

    (b) Formulate the structure and function of Zinc based enzyme carboxy peptidase —A.

19. (a) Explain how IR spectra useful for the structural determination of metal carbonyls.

    (b) Write the mechanism of hydrogenation and hydroformylation.

20. (a) Enumerate the steps involved in Nitrogen fixation.

    (b) Discuss about the structure and function of haemoglobin and myoglobin.

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D–1501	Sub. Code
	34432

DISTANCE EDUCATION

M.Sc. (Chemistry) DEGREE EXAMINATION,
DECEMBER 2025.

Third Semester

ADVANCED ORGANIC CHEMISTRY

(CBCS 2018 – 2019 Academic Year Onwards)

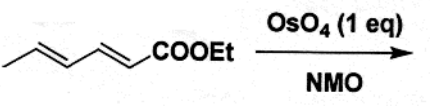
Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Write a structure of intermediate formed in the Jones oxidation.

2. Write the major product formed in the following reaction is



3. Give any two applications of $LiAlH_4$.

4. What is one group C-X disconnection reaction? Give one example.

5. Write the essential criteria for protecting groups.

6. Give any two examples of protecting groups.

7. What is monosaccharide?

8. What is the biological application of terpenoids?

9. Draw the structure of Vitamin E.

10. List out the physiological action of thiamin.

PART B — (5 × 5 = 25 marks)

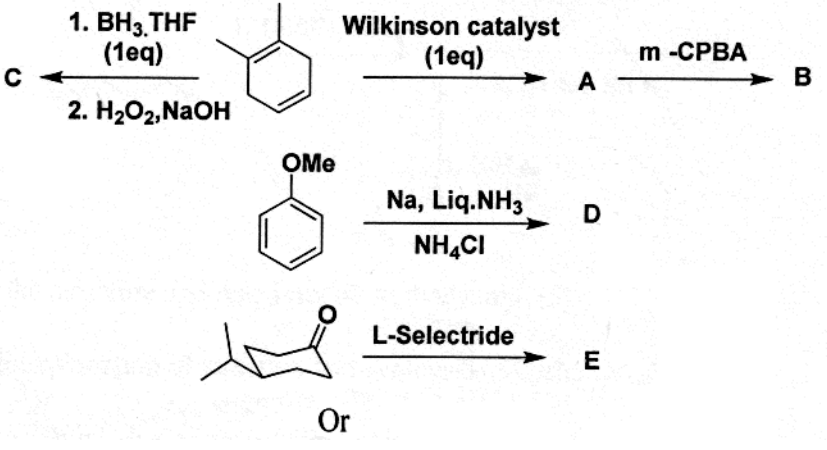
Answer ALL questions, choosing either (a) or (b).

11. (a) What is Fetizon reagent? Write any chemoselectivity reactions of Fetizon reagent.

Or

(b) Write the Baeyer villiger oxidation and its mechanism.

12. (a) Complete the following reaction (A to E)



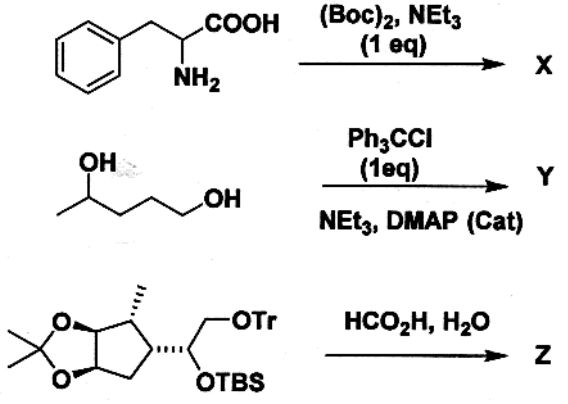
Or

(b) What is reteroxythesis? Give one example of FGI.

13. (a) Give any two examples of one group C-C disconnections.

Or

(b) Complete the following reactions (1+2+2)



14. (a) Elucidate the configuration and conformation of cellobiose.

Or

(b) Discuss in detail about the end group analysis.

15. (a) Write any one synthesis of Camphor.

Or

(b) Explain the chemistry and physiological action of Ascorpic acid.

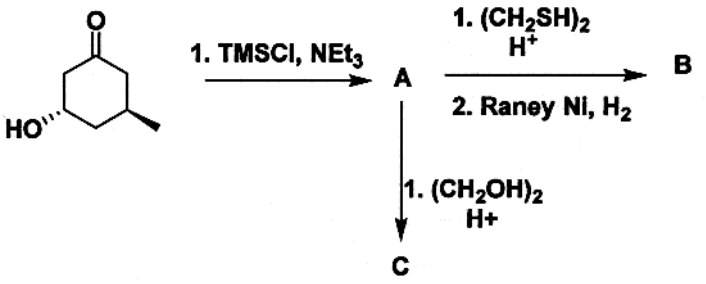
PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Write the Baeyer villiger oxidation and its mechanism with three examples.

17. What is stereoselectivity? How it will achieve in Corey - Bakshi - Shibato reduction.

18. (a) Complete the following reactions (A to C) (1+2+2)



(b) Write the structure and reactivity of Anthocyanin. (5)

19. Write a detail explanation of structure and synthesis of Camphor.

20. Discuss the structural elucidation of Cholestrol.

D–1502	Sub. Code
	34433

DISTANCE EDUCATION

M.Sc. (Chemistry) DEGREE EXAMINATION,
DECEMBER 2025.

Third Semester

SPECTROSCOPY — APPLICATIONS IN ORGANIC AND INORGANIC CHEMISTRY

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. List any two factors that affecting intensity of absorption bands.
2. What is the characteristics charge transfer complexes?
3. Classify various Bending vibrations.
4. What is the octant rule in stereochemistry?
5. Write any two applications ORD.
6. Give two examples for NMR shift reagents?
7. Define 'g' value.
8. ^{13}C is NMR active while ^{12}C is not. Explain.
9. List out the characteristics of DTA curves.
10. Sketch the Thermogravimetric curve with suitable examples.

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Discuss the principle and instrumentation of IR spectroscopy.

Or

(b) Write applications of ^{13}C NMR spectroscopy with suitable examples.

12. (a) Explain the following terms

(i) Fermiresonance;

(ii) Woodward Fieser Rules

Or

(b) Discuss about different types of electronic excitation.

13. (a) Discuss about general fragmentation in types, rules in mass spectroscopy with Suitable example.

Or

(b) What are the differences between ESR and NMR spectrometers?

14. (a) What is DTA? Enumerate the principle of DTA.

Or

(b) State α-haloketone rule and octant-rule.

15. (a) Illustrate the types of cotton effect curves.

Or

(b) Write a note on thermometric titration.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Write the basic principles of UV-Visible spectroscopy. What are the factors affecting position and intensity of absorption bands?

17. What do you mean by double resonance and Deuterium exchange reaction?

18. Discuss the principle and instrumentation and application of ^{1}H NMR spectroscopy.

19. Discuss about theory and various application of ESR Spectroscopy.

20. Describe the principle and instrumentation of flame photometry and Turbidimetry.

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D–1503	Sub. Code
	34441

DISTANCE EDUCATION

M.Sc. DEGREE EXAMINATION, DECEMBER 2025.

Fourth Semester

Chemistry

ANALYTICAL CHEMISTRY

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. What is precision?

2. Differentiate additive and proportional errors.

3. Define confidence limit.

4. What is the function of the ISE?

5. What are the applications of electrogravimetry?

6. Why is a dropping mercury electrode used in polarography?

7. What are the advantages of sublimation?

8. Point out the different types of detectors used in GC.

9. Mention any two application of Ion exchange chromatography

10. Define Chronopotentiometry

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Define error. How are they classified?

Or

(b) What are the rules to determine the significant figure? Explain.

12. (a) Discuss the following: (i) average deviation; (ii) least square method.

Or

(b) What are anion exchange resins? Give examples.

13. (a) Describe the principle and instrumentation of GC.

Or

(b) Describe the principle and instrumentation of HPLC

14. (a) Write a note on vaccum distillation method.

Or

(b) Discuss about principle and application of polarography.

15. (a) Illustrate the working principle involved in the various types of paper chromatography.

Or

(b) Describe the various applications of GC-MS with suitable example.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Discuss the following (a) Absolute and relative errors. (b) F-test; (c) Regression analysis (d) Standard deviation.

17. Describe the principle instrumentation and application of cyclic voltammetry.

18. Discuss the principle, types, instrumentation and application of HPLC.

19. Discuss the following (a) Coulometric analysis (b) Thin layer chromatography

20. (a) Define electro dialysis. What are the controlling factors?

    (b) Explain the theory of gel-permeation chromatography.

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D–1504

Sub. Code
34442

DISTANCE EDUCATION

M.Sc. (Chemistry) DEGREE EXAMINATION,
DECEMBER 2025.

Fourth Semester

APPLIED CHEMISTRY

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. What is mean by green house effect?

2. Define electrochemical corrosion.

3. What are corrosion inihibitors?

4. Give the type of fuel cells.

5. What is mean by throwing power?

6. Define Anodizing.

7. Define nanomaterials in chemistry.

8. What are spectral methods of nanomaterial characterization?

9. Define search engines.

10. What is mean by virtual lab?

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) What is called acid rain and explain their ill effects?

Or

(b) Write about the tertiary methods of wastewater treatment.

12. (a) Give an account of general classification of corrosion control methods.

Or

(b) Explain the Pourbaix diagram for Fe-H_2O system.

13. (a) Give an account of principles of electroplating methods.

Or

(b) Write about the composite coatings and their advantages.

14. (a) Write about the difference between batteries and supercapacitors.

Or

(b) Write about the alloy plating of Brass.

15. (a) Write about the microemulsion method of nanomaterial preparation.

Or

(b) Write about the TG/DTA and DSC methods of nanomaterial characterization.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Write about the physicochemical and biological investigations of water quality.

17. Write about the classification of batteries with suitable examples.

18. Write about the electrochemical methods of corrosion protection.

19. Write about the electroplating of nickel and copper.

20. (a) Explain the pulsed laser deposition method for nanomaterial preparation. (5)

    (b) Explain the XRD and FT-IR methods of nanomaterial characterization. (5)

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D–1505	Sub. Code
	34443

DISTANCE EDUCATION

M.Sc. (Chemistry) DEGREE EXAMINATION,
DECEMBER 2025.

Fourth Semester

ADVANCED PHYSICAL CHEMISTRY

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. How entropy and probability are related?

2. Define rotational partition function.

3. What is wave function?

4. State Pauli's exclusion principle.

5. What are symmetry elements?

6. Write the matrix representation for E operation.

7. Give two examples for molecules that exist in C_{3v} point group.

8. What is primary salt effect?

9. Write the Lineweaver-Burke equation for enzyme catalysis.

10. What is acid base catalyzed reaction?

PART B — (5 × 5 = 25 marks)

Answer ALL the questions, choosing either (a) or (b).

11. (a) Discuss about the Einstein theory of heat capacities.

Or

(b) Derive the expression for internal energy in terms of partition function.

12. (a) Write a note on self-consistent field (SCF) method.

Or

(b) Solve the Schrodinger wave equation for one dimensional harmonic oscillator system.

13. (a) Formulate the matrix representation for C_n operation.

Or

(b) State the axioms of Great orthogonality theorem.

14. (a) Discuss about the various factors which influences the rate of the reaction.

Or

(b) Explain the role of pH in enzyme kinetics.

15. (a) Elucidate the salient aspects of Zucker-Hammett hypothesis.

Or

(b) Write a note on secondary salt effect.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. (a) Derive the mathematical expression for Maxwell-Boltzmann Statistics. (8)

(b) What is non-equilibrium thermodynamics? (2)

17. Explain how total energy, delocalization energy and expression for wave functions are calculated for butadiene using HMO approach.

18. (a) Discuss the construction of C_2V character table. (7)

(b) Write the significance of direct product representation. (3)

19. (a) Derive the Bronsted-Bjerrum equation as applied in solution kinetics. (7)

(b) Give an account on influence of pressure in salt effect. (3)

20. Derive the expression for Michaelis-Menton equation for enzyme catalyzed reaction.

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