S–3968

Sub. Code
23MCH1C1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

First Semester

Chemistry

ORGANIC REACTION MECHANISM-I

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions

1. How do you distinguish between intermediate and transition state?

2. Prove that any one stereochemical information about a reaction product can help determine the mechanism of the reaction.

3. Why 10-annule is non-aromatic? Explain it.

4. What happened when benzene reacts with propylchloride in the presence of lewis acid?

5. Provide examples of ambident nucleophiles.

6. Explain why iodide (I^-) can act as both a good nucleophile and a good leaving group.

7. Distinguish between enantiotopic and diastereotopic atoms with suitable example.

8. Write note on asymmetric synthesis.

9. State Bredt's rule. Give an example.

10. Briefly explain the Curtin-Hammet principle in the context of stereochemistry.

Part B $(5 \times 5 = 25)$

Answer **all** questions choosing either (a) or (b).

11. (a) Describe one NON-kinetic method for analyzing reaction products that can provide insights into the mechanism of a reaction.

Or

(b) Explain a crossover experiment is a method used to study the reaction mechanism.

12. (a) Discuss the aromaticity of 12-annulene and 14-annulene.

Or

(b) Write in detail aliphatic electrophilic substitution reaction and mechanism of SE2.

13. (a) Describe the reaction mechanism of addition – elimination aromatic nucleophilic substitution reaction.

Or

(b) Write notes on Sommelet-Hauser and Smiles rearrangements.

14. (a) State and explain Prelog's rule with an example.

Or

(b) Explain the concept of optical purity and discuss two methods for determining the optical purity of a substance.

15. (a) Discuss the conformational analysis of Cis and Trans decalin.

Or

(b) Write brief notes on the following: i) Axial halo ketone rule ii) Cotton effect.

Part C $(3 \times 10 = 30)$

Answer any **three** questions.

16. (a) How kinetics and thermodynamics help us to understand the feasibility of reaction?

(b) Describe the role of sigma (σ) constants in LFERs. (7+3).

17. (a) Explain the mechanism of diazonium coupling with aniline.

(b) Illustrate Friedel-Craft's arylation reaction. (6+4).

18. Discuss the aliphatic nucleophilic substitution reaction and mechanism of S_N1 and S_N2.

19. Explain the concept of restricted rotation and its consequences on the stereochemistry of biphenyls and allenes. Discuss factors affecting the barrier to rotation and any relevant applications.

20. Explain the factors affecting the relative stability of disubstituted cyclohexane derivatives, considering both axial and equatorial positions of substituents.

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S–3969

Sub. Code
23MCH1C2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

First Semester

Chemistry

STRUCTURE AND BONDING IN INORGANIC COMPOUNDS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Section A (10 × 2 = 20)

Answer **all** the questions

1. Mention the applications of Pauling's rule of electrovalence.
2. What are the different types of phosphazenes?
3. Define Bravis lattices.
4. How do you derive the Born-Lande equation?
5. Draw the structure of rutile and anatase.
6. What are the four steps of crystallization?
7. State Scherrer formula.
8. Write the applications of electron diffraction technique.
9. Give the differences between Schottky and Frenkel defects.
10. What is laser? Mention its applications.

Section B (5 × 5 = 25)

Answer **all** the questions choosing either (a) or (b).

11. (a) Define closo, nido and arachno structures of boranes.

Or

(b) Describe the types of Polyacids with examples.

12. (a) Brief notes on the glide planes and screw axis of lattice.

Or

(b) State voids. Discuss the various types of voids in crystal lattice.

13. (a) Describe the crystal structure of nickel arsenide.

Or

(b) Write a note on:

(i) Spinels

(ii) Inverse spinels $(2^{1/2}+2^{1/2})$.

14. (a) Derive Bragg's equation for the diffraction of X-rays by crystal lattice.

Or

(b) Explain the following:

(i) JCPDS files

(ii) Phase purity $(2^{1/2}+2^{1/2})$

15. (a) Describe band theory of solids. How does it explain the behaviour of conductors, bad conductors and semiconductors?

Or

(b) Define phosphors. Explain its mechanism and mention its uses.

Section C $(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain the structural aspects for the hetero and metalloboranes.

17. Describe the Madelung constant of solid states.

18. Discuss about the structure based on the crystal growth methods.

19. Describe the instrumentation and applications TEM technique.

20. Explain the application linear defects and its effects due to disscociation.

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S–3970

Sub. Code
23MCH1E1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

First Semester

Chemistry

Elective: PHARMACEUTICAL CHEMISTRY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions

1. Define optical activity.
2. Give to two importance of monochromatic light.
3. What is drug action?
4. What is meant isotopic dilution?
5. State drug design.
6. Give the source of drug.
7. Define drug design.
8. What is rate theory?
9. What are software components?
10. Short note on interpolation.

Part B (5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) Explain the Rheology of pharmaceutical systems.

Or

(b) Discuss the Reduced and Intrinsic viscocity.

12. (a) Write a note isotopic dilution analysis principle and applications.

Or

(b) Explain the partition coefficient of drugs.

13. (a) Describe the drug delivery system.

Or

(b) Explain the source of drugs.

14. (a) Discuss the structure and activity relationship.

Or

(b) Write a note on induced fit theory.

15. (a) Describe the need of computers for chemistry.

Or

(b) Explain the data smoothing.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Explain the selection of viscometer for Newtonian and non-Newtonian system.

17. Discuss the Radiopharmaceuticals as diagnostics.

18. Describe the classification of dosage forms.

19. Write a note on quantitative structure activity relationship.

20. Explain the language (C+) to handle various numerical methods in chemistry.

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S–3971	Sub. Code
	23MCH1E2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

First Semester

Chemistry

Elective: NANO MATERIALS AND NANO TECHNOLOGY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Section A (10 × 2 = 20)

Answer **all** the questions

1. Define Nanomaterials and its dimensions.
2. What is nanowire?
3. What is the size of a metal nanoparticle?
4. Define Specific surface area.
5. Why is friction important property of nano particals?
6. Why is silver used in nanoparticles?
7. Mention the electrical application of nanoparticles.
8. What is p-n junction in transistor?
9. Give the advantages of core-shell nanoparticles.
10. Which matrix is used in composites?

Section B (5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) Write the classification of nanomaterials based on dimension.

Or

(b) Describe the tools of nanoscience and nanotechnology.

12. (a) Write a note on: electrochemical synthesis.

Or

(b) How will you determine the size and properties of nanoparticles using inert gas condensation method?

13. (a) Discuss the thermal properties of nanomaterials.

Or

(b) Write a note on: Gold and silver nanoparticles.

14. (a) Discuss the classification of semiconductor materials.

Or

(b) Write a note on: Photogalvanic cell.

15. (a) Give the applications of nanoparticles in biological field.

Or

(b) What is AFM? Discuss its instrumentation.

Section C (3 × 10 = 30)

Answer any **three** questions.

16. Explain the synthesis of nanomaterials in bottom-up and top-down methods.

17. Describe the low-pressure CVD method for nanomaterials.

18. Discuss the synthesis and properties of iron oxide and alumina.

19. What is Hall Effect? List out the importants.

20. Explain the types, synthesis and properties of core-shell nanoparticles.

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S–3972

Sub. Code
23MCH1E3

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

First Semester

Chemistry

Elective: ELECTRO CHEMISTRY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. Give to two limitations of Arrhenius theory.
2. Define ionic activity.
3. What is electro-osmosis?
4. Short note on colloidal.
5. State behavior of electrodes.
6. Define over potential.
7. What is rate determining step?
8. State Evan's diagrams.
9. Define fuel cell.
10. What is polargraphy?

Part B (5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) Explain the Debye Huckel theory of strong electrodes.

Or

(b) Discuss the qualitative and quantitative verification and limitations.

12. (a) Describe the polarizable and non-polarizable interfaces.

Or

(b) Write a note on zeta potential.

13. (a) Explain the model of three electrode system.

Or

(b) Discuss the low and high field approximations.

14. (a) Describe the multi-step electrode reactions.

Or

(b) Draw the Pourbiax and Evans diagrams.

15. (a) Explain polarography principle and applications.

Or

(b) Discuss the high temperature fuel cells.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Explain the Debye Huckel Bjerrum model.

17. Discuss the chapman and stern models of electrical double layer.

18. Describe the Tafel equations and Tafel plats.

19. Write a note on evolution of oxygen and hydrogen at different pH.

20. Discuss the sodium and lithium batteries.

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S–3973

Sub. Code
23MCH1E4

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

First Semester

Chemistry

Elective: MOLECULAR SPECTROSCOPY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions

1. When a heavier isotope is substituted for a lighter isotope in a molecule, how will the moment of inertia (I) of the molecule be affected?

2. State mutual exclusion principle.

3. Why homonuclear diatomic molecules do not exhibit pure rotational spectra in the infrared region.

4. What is the selection rule for transitions observed in the rotational spectrum of a diatomic molecule?

5. What information about a molecule can be obtained from its electronic spectrum?

6. Mention two properties of laser light compared to light from a regular light bulb.

7. Write note on chemical shift.

8. What is spin-orbit coupling, and how does it affect the g-factor observed in ESR spectroscopy?

9. Explain why hyperfine coupling can be a valuable tool for identifying the type of atom an unpaired electron resides on in a molecule.

10. Write note on Isomer shift.

Part B $(5 \times 5 = 25)$

Answer **all** questions choosing either (a) or (b).

11. (a) The energy separation of $^{12}C^{16}O$ rotational energy levels between J" = 3 and J" = 9 is 24 cm^{-1}. Find out the rotational constant of $^{13}C^{16}O$.

Or

(b) Write short notes on stokes and anti-stokes lines in Raman spectra.

12. (a) Discuss the P, Q, R branches in vibration-rotation spectroscopy.

Or

(b) Explain the selection rules for vibrational spectroscopy.

13. (a) Describe the difference between dissociation and predissociation in the context of electronic transitions and their impact on electronic spectra.

Or

(b) Explain the X-ray photoelectron spectroscopy.

14. (a) What is Nuclear Overhauser Effect? How does it is useful in stereochemical analysis?

Or

(b) How does Kramers Degeneracy relate to electron spin? What are the consequences of this degeneracy being lifted?

15. (a) Compare the electron ionization, chemical ionization and electrospray ionization.

Or

(b) Discuss the applications of Mossbauer spectra of high and low-spin Fe compounds.

Part C $(3 \times 10 = 30)$

Answer any **three** questions.

16. (a) Describe the linear and asymmetric top molecules with examples. (7)

(b) In the H_2 molecule, when H_2 is replaced by deuterium (D). What will happen to the rotational B? (3)

17. (a) Discuss the limitations of the Born-Oppenheimer approximation and give some examples of where it breaks down. (5)

(b) Describe what overtone and combination frequencies. Give their examples. (5)

18. (a) What is Franck Condon Principle? How does it explain vibronic transition and vibration progression? (7)

(b) Explain the X-ray photoelectron spectroscopy. (3)

19. (a) Write short note on coupling constant. Explain the vicinal and geminal coupling with an example. (7)

(b) Comment on COSY and NOESY in 2D NMR. (3)

20. (a) Comment on Doppler shift and recoil energy.

(b) Briefly describe the fundamental principle behind Mossbauer spectroscopy.

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S–3974

Sub. Code
23MCH2C1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

Second Semester

Chemistry

ORGANIC REACTION MECHANISM – II

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. What are the typical reaction conditions for pyrolytic elimination process?
2. Mention one common technique used for indirect detection of free radicals in a reaction mixture.
3. Provide one example each of a common hydride donor and a common hydride acceptor in organic chemistry.
4. Write the role of dimethyl sulfoxide (DMSO) in organic synthesis? Briefly mention one advantage of using DMSO as a solvent.
5. Find out the starting materials and products in a Stevens rearrangement.
6. What is the driving force behind rearrangements involving electron-deficient carbon atoms?
7. Predict the structure of the compound formed when Grignard reagent reacts with benzonitrile.
8. How does the reaction between a carbene and an olefin differ from a typical addition reaction to an alkene?

9. Point out the primary function of $NaBH_3CN$ in organic reactions.

10. Write short note on Heck reaction.

Part B $(5 \times 5 = 25)$

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

11. (a) Illustrate Hoffmann and Saytzeff rules.

Or

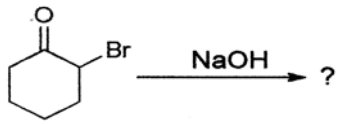
(b) Discuss the role of free radicals in aromatic substitution reactions.

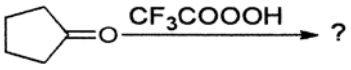
12. (a) Explain the mechanism of dehydrogenation for each of the following reagents. Quinones and Selenium dioxide.

Or

(b) Write short notes on MPV and Bouveault-Blanc reduction.

13. (a) Find out the product in the following reactions.

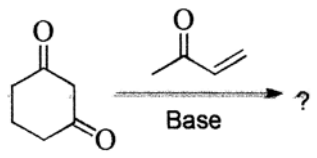
(i) 

(ii) 

Or

(b) Distinguish between the Hofmann rearrangement, Curtius rearrangement and lossen rearrangement.

14. (a) Find out the product in the following reactions. Give their plausible mechanism.



Or

(b) List the three essential components required for a Mannich reaction and briefly explain their roles.

15. (a) What is LDA? How do you prepare? Mention its use in the field of organic chemistry.

Or

(b) Explain the features of the Suzuki coupling reaction. Include the type of reactants, catalyst and a general advantage of this reaction.

Part C $(3 \times 10 = 30)$

Answer any **three** questions.

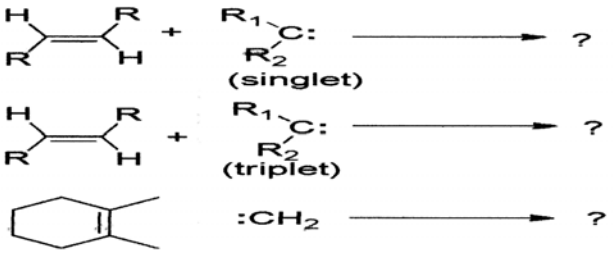
16. (a) Predict the stereochemistry of the elimination product formed in dehydrohalogenation of cis-1,2-dicyclohexanol using KOH (aq) in ethanol.

(b) Explain the role of free radicals in each stage of the polymerization process. (4 + 6)

17. Discuss the mechanism of Clemmensen and Wolff Kishner reduction. (5 + 5)

18. Explain the mechanism of Beckmann rearrangement and Bayer-Villiger Oxidation.

19. (a) Predict the product: (6)



(b) Explain the mechanism of the Stobbe condensation using enolates as nucleophiles. (4)

20. Provide the full names and a brief description of the function of each reagent in organic synthesis of following (a) DBU, (b) PCC, (c) NBS, (d) PDC and (e) DEAD.

S–3975

Sub. Code
23MCH2C2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

Second Semester

Chemistry

PHYSICAL CHEMISTRY-I

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Section A (10 × 2 = 20)

Answer **all** the questions

1. Define chemical potential.

2. What is meant by activity coefficients?

3. What are ensembles?

4. What is molar heat capacity?

5. State linear law.

6. What is entropy production?

7. Write Eyring equation relating ΔG,ΔH and ΔS.

8. Give the account on enzyme catalysis.

9. Define Chain reaction with an example.

10. Write the differences between Thermal and photochemical reactions.

Section B (5 × 5 = 25)

Answer **all** the questions choosing either (a) or (b).

11. (a) What is chemical potential? How does it vary with Temperature and Pressure?

Or

(b) Define the term: $(2^{1/2}+2^{1/2})$

(i) Activity

(ii) Fugacity

12. (a) Write a note on thermodynamic probability.

Or

(b) Distinguish between Fermi-Dirac and Bose-Einstein Statistics.

13. (a) Derive an expression for entropy production and entropy flow in an open system.

Or

(b) Discuss the application of irreversible thermodynamics to biological systems.

14. (a) Compare collision theory with absolute reaction theory.

Or

(b) Explain the Lindemann theory of unimolecular reactions.

15. (a) Write a note on consecutive reactions.

Or

(b) Describe the flash photolysis method in the study of fast reactions.

Section C (3 × 10 = 30)

Answer any **three** questions.

16. Derive Gibbs-Duhem equation and discuss its applications.

17. Explain the Fermi – Dirac Statistics and derive the corresponding distribution function.

18. Define and discuss the four electrokinetic effects SP,EO,EOP and SC.

19. Deduce Michaelis Menten equation and give conditions under which an enzyme catalyzed reaction changes its order.

20. Derive an equation for the kinetics of hydrogen-bromine reaction.

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S–3977

Sub. Code
23MCH2E2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

Second Semester

Chemistry

Elective: GREEN CHEMISTRY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Section A (10 × 2 = 20)

Answer **all** questions

1. What are the goals of green Chemistry?
2. List any two limitations of Green Chemistry.
3. Write any two advantages of super critical CO_2.
4. How is adipic acid synthesized by green method?
5. Give any two examples of green catalysis.
6. What is acid catalysis? Give an example.
7. Give the structure of crown ether.
8. Write any one elimination reaction.
9. What is meant by microwave induced green synthesis?
10. Give the wavelength of microwave region.

Section B (5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) Illustrate the autumn economy with examples.

Or

(b) Comment on Bhopal Tragedy.

12. (a) Give on account of green synthesis of Dimethyl carbonate.

Or

(b) Explain the green synthesis of catechol.

13. (a) Describe the function of Polystyrene aluminum chloride.

Or

(b) Write a note on Polymeric super acid catalysis.

14. (a) Explain the oxidation reaction using hydrogen peroxide.

Or

(b) Describe the esterification reaction with examples.

15. (a) Explain the principles of microwave induced green synthesis.

Or

(b) Discuss the instrumentation of Sono chemistry.

Section C (3 × 10 = 30)

Answer any **three** questions.

16. State the Twelve principles of green chemistry.

17. Give on account of choice of starting material in green synthesis.

18. Give a detailed account of poly supported photosensitizers.

19. Discuss the role of phase transfer catalysis in green synthesis.

20. Describe the Ultra sound assisted green synthesis and its applications.

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S–3978	Sub. Code
	23MCH2E3

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

Second Semester

Chemistry

Elective — BIO - INORGANIC CHEMISTRY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions

1. What is Ion-enzymes?
2. Define Plast ocyanin.
3. Short note on Bohr effect.
4. Define cytochrome P-450.
5. What is Nitrogenase enzyme?
6. Write a short note on redox property.
7. What are toxicity metals.
8. Short note on chelation therarpy.
9. What is enzyme kinetics?
10. Give two properties of enzyme.

Part B (5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) Give an introduction of metal ions in biology.

Or

(b) Why zinc is so valuable in biology relative to other metals?

12. (a) Give structure and classifications of Rubredoxin.

Or

(b) Write a note on non-heme oxygen carriers.

13. (a) Give an account of biological nitrogen fixation.

Or

(b) Draw the structure of chlorophyll and give its significance.

14. (a) Explain the Vanadium-based diabetes drugs.

Or

(b) Discuss the toxicity of same non-essential metals.

15. (a) Explain the introduction and properties of enzyme.

Or

(b) Discuss the factors contributing to the efficiency of enzyme.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Give structural features and functions of metallo bio molecules having copper as metal centre.

17. Explain the molecular mechanism of ion transport across membrane.

18. Briefly summarize the PS-I and PS-II systems involved in photosynthesis.

19. Describe the gadolinium MRI imaging agents.

20. Discuss the effect of pH and temperature on enzyme reactions.

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S–3981

Sub. Code
23MCH3C1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

Third Semester

Chemistry

ORGANIC SYNTHESIS AND PHOTOCHEMISTRY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. Define: Retrosynthetic analysis.

2. Write about available starting materials for synthesis.

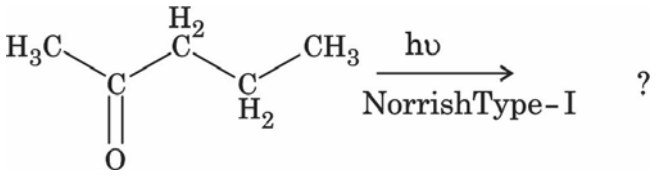
3. What are synthons and synthetic equivalents? Explain with suitable examples.

4. Give any two protecting groups for amino functional group.

5. Draw the molecular orbital diagram of 1, 3-butadiene.

6. Carry out [2+2] cycloaddition using EMO approach with suitable example.

7. Predict the products formed in the following Norrish Type-I reaction?



8. What is degenerate cope rearrangement? Explain.

9. Predict cis-trans isomerisation of stilbene.

10. Write about photostationary state.

Part B (5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) How the convergent approach does more reliable than linear approach? Explain with suitable example.

Or

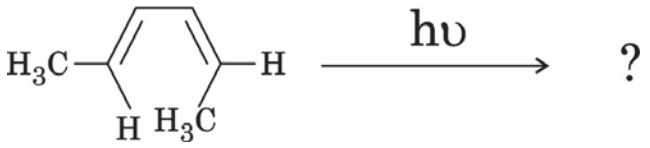
(b) Discuss about the importance of key intermediates in planning organic synthesis.

12. (a) Give any five orders of events in retro synthesis with examples.

Or

(b) Explain the concept of Umploung in organic synthesis.

13. (a) Write the products formed in the following electrocylic reaction and show whether the reaction proceeds in a con rotatory or dis rotatory manner with stereochemical significances.



Or

(b) Confirm [4+2] cycloaddition reaction is thermally allowed reaction with the help of FMO and PMO methods.

14. (a) Confer the mechanism of photoreduction of benzophenone.

Or

(b) What is Paterno-Buchi reaction? Discuss its mechanism and stereochemical effect with suitable example.

15. (a) Discuss about the mechanism of photo Fries rearrangement.

Or

(b) Give the mechanism of Barton's reaction.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Describe the following terms with examples.

    (a) Target molecule

    (b) Precursors

    (c) Activating groups

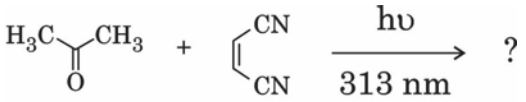
    (d) Bridging elements

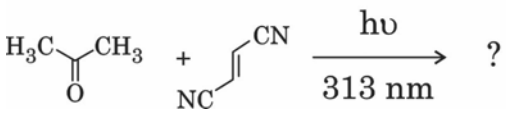
17. Explain the function of the various protecting groups for Hydroxl, Carboxyl, carbonyl groups with suitable examples in organic synthesis.

18. (a) Describe the mechanism of [1,5] sigmatropic rearrangement with its stereochemistry using suitable example.

    (b) Give the mechanism of cheletropic reaction of alkene with singlet carbene.

19. (a) Predict the products formed in the following photo cycloaddition reaction with stereochemical effect.





    (b) Discuss about group transfer reactions with its examples.

20. Describe *Di* – π methane rearrangement and its mechanism.

S–3982

Sub. Code
23MCH3C2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

Third Semester

Chemistry

COORDINATION CHEMISTRY-I

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions

1. What is π donor and π acceptor ligands on tetrahedral complexes?

2. Draw the crystal field splitting diagram for $[CoCl_4]^{2-}$

3. Write a spin selection rule?

4. Define charge transfer transition and its types.

5. Explain the term thermodynamic and kinetic stability.

6. Calculate magnetic moment of $3d^3$ elements corresponds to spin only value.

7. Write any two example of substitution reaction in square planar complexes.

8. What is kurnakov test?

9. Write note on photo isomerization reaction with example?

10. What are the bridge ligands used in inner sphere electron transfer reaction?

Part B $(5 \times 5 = 25)$

Answer **all** questions choosing either (a) or (b).

11. (a) Draw the MOT diagram for tetrahedral complex taking example.

Or

(b) Explain the antispinel structure using CFT.

12. (a) Discuss the detail about orgel diagram of d^3 ions.

Or

(b) What are the selection rules in electronic spectra? Explain it.

13. (a) How can stability constant of complex measured by potentiometric method.

Or

(b) What are the factors affecting the stability of complexes?

14. (a) How will you synthesis Cis- $[Pt(NH_3)_2Cl_2]$

Or

(b) Explain the water replacement reaction.

15. (a) What is photo substitution reaction? Give a suitable example.

Or

(b) Write a short note on outer sphere mechanism with example.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Discuss d-orbital splitting in octahedral and tetrahedral field with example.

17. Demonstrate the electronic spectra of d^2 configurations based on orgel diagram in octahedral and tetrahedral complexes.

18. Explain stepwise stability constant using Bjerrum's method.

19. Describe the dissociative mechanism of octahedral complexes.

20. Illustrate the electron transfer reaction in inner sphere machanism of octahedral complexes with examples.

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S–3983

Sub. Code
23MCH3E1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

Third Semester

Chemistry

Elective: PHARMACOGNOSY AND PHYTOCHEMISTRY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions

1. Define pharmacognosy.

2. Which pathway is involved in the biosynthesis of aromatic amino acids?

3. Describe the percolation technique.

4. How does the choice of solvent impact the extraction process?

5. What are monoterpenoids and provide an example?

6. How many carbon atoms are present in one isoprene unit?

7. What reagent is used in Dragendorff's test?

8. How do the structures of morphine and papaverine differ?

9. How the plant glycosides classified?

10. Write a common basic ring system found in plant glycosides?

Part B (5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) Describe the Shikimic acid pathway and the acetate pathway.

Or

(b) Elaborate the WHO guidelines for the sampling and evaluation of crude drugs.

12. (a) Discuss the maceration method of extraction. Explain the steps involved and its advantages and disadvantages.

Or

(b) Illustrate the percolation technique of extraction. Detail the procedure and compare it to maceration and decoction?

13. (a) Explain the isoprene rule and its significance in the structure and function of terpenoids.

Or

(b) Outline various techniques used for the isolation and separation of terpenoids.

14. (a) Discuss the occurrence and distribution of alkaloids in the plant kingdom.

Or

(b) Elaborate the preliminary qualitative tests used to detect the presence of alkaloids.

15. (a) Give a brief account of various types of marine toxins and their sources.

Or

(b) Describe the mechanisms of action and their significance in treating bacterial infections.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Exemplify the general chemical tests and extraction techniques used in phytochemical investigations.

17. Outline the immersion method of extraction. Explain how it differs from other general methods like maceration and percolation.

18. Describe the structure of eucalyptol. Discuss its general properties and its therapeutic uses.

19. Discuss the pharmaceutical importance of alkaloids. Provide examples of well-known alkaloids and their therapeutic uses.

20. Explain the role of plant pigments such as quercetin and cyanidin chloride in plants.

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S–3984

Sub. Code
23MCH3E2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

Third Semester

Chemistry

Elective : BIOMOLECULES AND HETEROCYCLIC COMPOUNDS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. What is carbohydrate? Give any two examples.

2. What is dissacharide? Give an examples.

3. What is steroid? Where does it occur?

4. What are harmones? Write its importance.

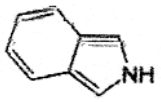
5. What is catabolism? Write the catabolic end product of amino acid.

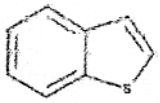
6. Name the methods used for the separation of proteins.

7. What is carbohydrate metabolism?

8. Explain beta oxidation process.

9. Name the following heterocyclic compounds.

(a) 

(b) 

10. Draw the structure of

(a) Indole

(b) Benzofuran

Part B (5 × 5 = 25)

Answer **all** the questions choosing either (a) or (b).

11. (a) Outline the classification of carbohydrates with an example for each type.

Or

(b) Draw the Haworth formula for Glucose and Mannose.

12. (a) Discuss the functions of androgens and estrogens.

Or

(b) Write the colour reactions of cholesterol.

13. (a) Explain the terms

(i) Transamination

(ii) Oxidative deamination

Or

(b) Draw and explain the Watson Crick model of DNA.

14. (a) Explain the aerobic metabolism of carbohydrate.

Or

(b) How do you effect the conversion of fat to carbohydrate?

15. (a) Write the preparation and chemical properties of Indole.

Or

(b) Write any one preparation for quinoline and isoquinoline. (2.5 + 2.5)

Part C (3 × 10 = 30)

Answer any **three** questions.

16. What are lipids? Write its classifications, properties and structure.

17. Discuss the structure and functions of adrenaline and thyroxin.

18. (a) Describe the primary and secondary structure of RNA with a neat diagram.

(b) How do you effect the solid phase synthesis of oligonucleotides.

19. (a) Write a detailed biosynthesis of fatty acids and fat.

(b) Explain the process of Omegan oxidation.

20. (a) Compare the chemical properties of quinoline and isoquinoline.

(b) Write the preparation and chemical properties of Benzofuran.

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S–3985

Sub. Code
23MCH3S1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

Third Semester

Chemistry

INDUSTRIAL CHEMISTRY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions

1. What is the scope of small –scale industries in economic development?

2. List out the criteria were commonly used to classify an industry as small-scale?

3. Distinguishes a cottage industry from other types of industries.

4. Give an example of a small-scale industry that can be started with minimal investment.

5. What factors influence the location of industries?

6. How does access to raw materials affect industrial location?

7. Write the purpose of registering a small-scale industry?

8. How can citric acid be isolated from lemons?

9. Provide an example of a hands-on experiment related to food adulteration.

10. What is a simple test to detect adulterants in milk?

Part B $(5 \times 5 = 25)$

Answer **all** questions choosing either (a) or (b).

11. (a) Explain the concept of village industries, providing examples of typical products.

Or

(b) Identify and discuss industries that can be easily started or developed as small-scale enterprises.

12. (a) Analyze the factors that contribute to the success of small scale industries.

Or

(b) Outline the essential steps to be taken before constructing or establishing a factory.

13. (a) List out the Importance of Licenses and Registration is Small Scale Industries.

Or

(b) Discuss the Important significant of Hands-On training in Industrial Chemistry.

14. (a) How the practical training enhances learning and prepares students for real-world industrial challenges.

Or

(b) List out the methods for detecting adulterants in Food Products.

15. (a) Provide examples of specific tests and their relevance to food safety.

Or

(b) Compare and contrast natural and synthetic dyes used in dyeing cotton fabrics.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Explain the significance of caffine and critic acid products in industry and daily life.

17. Discuss the role of small scale industries in job creation, entrepreneurship, and rural development.

18. Provide a comprehensive definition of small-scale industries, including the criteria used to classify an industry as small-scale.

19. Describe the village industries contribute to rural development and sustainable livelihoods.

20. Outline the essential steps to be taken before constructing or establishing a factory.

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