Total No. of Printed Pages:02

SUBJECT CODE NO- NEPHR-01-2025

FACULTY OF SCIENCE AND TECHNOLOGY

EXAMINATION WINTER 2025

M.SC (FIRST YEAR) (SEM-I)

COMMON PAPER

SVECRM-401-RESEARCH METHODOLOGY(COMPULSORY)

[Time: 3:00 Hours] **[Max.Marks:45]**

"Please check whether you have got the right question paper."

N.B.
1. Question No. 1 is Compulsory.
2. Solve any TWO questions from Question No. 2 to 5.
3. Calculator and log table allowed.

Q.1 Write notes on: **5X3=15**

1. Research objectives
2. Features of good research designing
3. Editing processing operations
4. statistical measures in research
5. Variables

Q.2 1. Describe various steps involved in research. **08**

2. Explain types of research hypothesis. **07**

Q.3 1. Explain meaning and need of good research designing. **08**

2. Describe descriptive and fundamental types of research. **07**

Q.4 1. Calculate, mean, median and mode of the following data. **08**

Class Interval (CI)	Frequency (F)
50-54	2
45-49	5
40-44	8
35-39	7
30-34	10
25-29	5
20-24	9
15-19	2
10-14	1
5-9	1

2. Describe observation method for collection of primary data. **07**

Q.5 1. calculate chi square (x^2) value of the following data. **08**

Excellent	Average	Poor	Total
58	32	30	120

2. Explain in detail case study. **07**

This question paper contains **2** printed pages]

NEPHR—60—2025

FACULTY OF SCIENCE

M.Sc. (First Year) (First Semester) EXAMINATION

NOVEMBER/DECEMBER, 2025

(NEP-2020)

CHEMISTRY

Paper SCHEC-401

(Inorganic Chemistry)

(Monday, 15-12-2025) **Time : 10.00 a.m. to 12.30 p.m.**

Time—2½ *Hours* *Maximum Marks*—60

N.B. :— (1) Question No. **1** is compulsory and solve any *three* from remaining five.

(2) Calculator and log table is allowed.

1. (*a*) Describe the factors affecting the liability of metal complexes. 3

(*b*) How to π acceptors ligands influence the trans effect ? 3

(*c*) Calculate the number of microstate for p^3 and d^3 arrangements. 3

(*d*) Explain semiconducting nanoparticles a novel optical property of nanomaterials. 3

(*e*) Explain spin selection rules for electronic transition in complexes. 3

P.T.O.

2. (*a*) Describe the role of DNA functionalized nanoparticles in biosensing applications. 8

(*b*) What is charge transfer spectra ? How is it differ from *d-d* transition in transition metal complexes ? 7

3. (*a*) Compare the Orgel diagram and Tanable Sugano diagram for d^2 configuration. 8

(*b*) Write about the synthesis and uses of carbon nanotubes. 7

4. (*a*) Draw and explain Orgel diagram for d^1 and d^9 configuration in octahedral complexes. 8

(*b*) Explain the ligand substitution mechanism in square planar complexes. Why do they typically follow on associative (S_N2-type pathway) ? 7

5. (*a*) Discuss three-dimensional nanomaterials and their typical synthesis routes. How their properties differ from 1D and 2D nanomaterials ? 8

(*b*) Why do tetrahedral complexes of *d*-block elements give much more intense *d-d* spectra than its on complexes ? 7

6. Write short notes on (any *three*) : 15

(*a*) Polarising theory

(*b*) Artificial nanomaterials

(*c*) Spin crossover complexes

(*d*) Laporte selection rule.

This question paper contains **2** printed pages]

NEPHR—30—2025

FACULTY OF SCIENCE

M.Sc. (First Year) (Second Semester) EXAMINATION

NOVEMBER/DECEMBER, 2025

(NEP-2020)

CHEMISTRY

Paper SCHEC-1451

(Inorganic Chemistry)

(Saturday, 13-12-2025) **Time : 10.00 a.m. to 12.30 p.m.**

Time—2½ *Hours* *Maximum Marks*—60

N.B. :— (1) Question No. **1** is compulsory and solve any *three* of the remaining five.

(2) Log table and calculator is allowed.

1. (*a*) Explain the principle of catalytic reaction. 3

(*b*) Give an account of non-essential elements. 3

(*c*) How many lines do you expect in $[SiH_3]$? 3

(*d*) Write a note on *g* value in esr spectroscopy. 3

(*e*) Explain $Mn(CO)_5$ is isolobal with CH_3. 3

P.T.O.

2. (*a*) Explain the application of homogeneous catalysis in hydrogenation of alkenes using Wilkinson catalyst. 8

(*b*) Calculate the force constant for the bond in CO. 7

Given :

Fundamental vibrational frequency is $6.4296 \times 10^{13}\ s^{-1}$

Atomic weight of C = 12.011

O = 15.999.

3. (*a*) What are Frontier orbitals ? Explain ML_6 complex is isolobal with CH_4 radical. 8

(*b*) Explain Mossbauer spectra of $K_3[Fe(CN)_6]$. 7

4. (*a*) What is Fischer-Tropsch synthesis ? Discuss its mechanism. 8

(*b*) Describe the photosynthesis PS-I and PS-II reactions. 7

5. (*a*) Explain ESR lines, hyperfine structure and relative intensities of semibenzoquinone radical. 8

(*b*) Describe biological enzyme vitamin B_{12}. 7

6. Write short notes on (any *three*) : 15

(*a*) Tethered catalyst

(*b*) Transferrin

(*c*) Calibrating compound in ESR

(*d*) Isolobal analogy.

This question paper contains **3** printed pages]

HR—258—2025

FACULTY OF SCIENCE

M.Sc. (Second Year) (Third Semester) EXAMINATION

NOVEMBER/DECEMBER, 2025

(New/CBCS Pattern)

ORGANIC CHEMISTRY

Paper XVIII (OCH-514)/(CH-534/2A)

(Medicinal Chemistry)

(Monday, 22-12-2025) **Time : 2.00 p.m. to 5.00 p.m.**

Time—3 *Hours* *Maximum Marks*—75

N.B. :— (1) Attempt *all* questions.

(2) Figures to the right indicate full marks.

1. Solve any *three* of the following : 15

(*a*) What are coagulants ? Explain mechanism of Blood Clotting.

(*b*) Give SAR and synthesis of Cycloserine.

(*c*) Explain Biological and Chemical Assay.

(*d*) Explain drug absorption in Pharmacokinetics of a drugs.

(*e*) What are antibiotics ? How are they classified ?

P.T.O.

2. Attempt any *three* of the following : 15

(*a*) Explain structure based drug design.

(*b*) Write a note on Immunological assay.

(*c*) What are Soft and Hard Drugs ? Give their properties.

(*d*) Offer synthesis and SAR of 4-amino salicylic acid.

(*e*) Write a note on lipophilicity in QSAR study.

3. (*a*) Explain drug distribution and drug elimination with respect to Pharmacokinetics. 8

Or

Explain hydrolysis and conjugation with the help of suitable examples of Drug Metabolism.

(*b*) Discuss occupancy and rate theories of drug activity. 7

Or

Write notes on :

(*i*) Sulfonamides

(*ii*) Membrane active drugs.

4. (*a*) Explain SAR, mode of action of chloramphenicol. 8

Or

Explain mechanism of Drug Action.

(*b*) What are lead compounds ? Explain about lead discovery with suitable example. 7

Or

Write a note on Competitive Inhibitors.

5. (A) Discuss about Enzyme Inhibition in Drug Design. 5

(B) Write short notes on (any *two*) : 10

(*a*) Mechanism of blood clotting

(*b*) LD_{50} and ED_{50}

(*c*) Biological Defence.

This question paper contains **3** printed pages]

HR—260—2025

FACULTY OF SCIENCE

M.Sc. (Second Year) (Third Semester) EXAMINATION

NOVEMBER/DECEMBER, 2025

(New CBCS Pattern)

ORGANIC CHEMISTRY

Paper CH-534/2B

(Polymer Chemistry—I)

(Monday, 22-12-2025) **Time : 2.00 p.m. to 5.00 p.m.**

Time—3 *Hours* *Maximum Marks*—75

N.B. :— (1) Attempt *all* questions.

(2) Figures to the right indicate full marks.

1. Answer the following (any *three*) : 15

(*a*) Explain co-ordination polymerisation with example.

(*b*) Describe spray-up process for producing reinforced plastic artices.

(*c*) Explain factors influencing glass transition temperature.

(*d*) Sketch typical stress-strain curve for silk-like and wool-like fibres.

P.T.O.

(*e*) Explain calendering process to produce films and sheets.

(*f*) Equal masses of polymer molecules with M_1 = 10,000 and M_2 = 1,00,000 are mixed. Calculate $\bar{M}_n$ and $\bar{M}_w$.

2. Solve any *three* of the following : 15

(*a*) What is degree of polymerisation ? Explain with examples.

(*b*) Define Mathematically number average molecular weight and weight average molecular weight of polymer.

(*c*) How may X-ray diffraction data be used to estimate the size of polymer crystallinity ?

(*d*) Comment in detail on rotational casting.

(*e*) What are polymers ? What are types of polymers ?

(*f*) Explain Zieglar-Natta catalyst for the synthesis of polymer.

3. (*a*) Draw structural formulas indicating the stereoregular chain configuration in : 8

(*i*) Isotactic polypropylene

(*ii*) Syndiotactic polyvinyl chloride.

Or

State the different methods of spinning of a polymer and explain in detail on wet-spinning process.

(*b*) Determination of molecular weight of polymer by sedimentation equilibrium method. 7

Or

Explain in detail on bulk polymerisation with its merits and demerits.

4. (*a*) Describe the process of determination of molecular weight of polymer by light scattering method. 8

Or

Describe the solution polymerisation of polymer with its merits and demerits.

(*b*) Mention different types of moulding process and explain 'Extrusion Moulding' in detail. 7

Or

Explain how spectroscopic technique used for determining polymer ?

5. Write notes on the following (any *three*) : 15

(*a*) Elastomer

(*b*) Single crystal structure

(*c*) Strain induced morphology

(*d*) Tear Resistance and Abression Resistance.

Total No. of Printed Pages:02

SUBJECT CODE NO- NEPHR-307-2025

FACULTY OF SCIENCE AND TECHNOLOGY

EXAMINATION WINTER 2025

M.SC (SECOND YEAR) (SEM-III)

ORGANIC CHEMISTRY

MEDICINAL CHEMISTRY

[Time: 3:00 Hours] **[Max.Marks:80]**

"Please check whether you have got the right question paper."

N.B. (i) Question No. 1 is compulsory.
(ii) Solve any three from remaining five questions.

Q.1 Answer the following: **20**

(i) Biological defences.
(ii) What are prodrugs? How are they classified?
(iii) Sulphonamides.
(iv) Discuss SAR of Coumarin derivatives.

Q.2 Discuss the following: **20**

(i) Biological assay and Chemical assay.
(ii) Discuss Homologation, chain branching, ring chain transformation and bio-isosterism used in structure modification of drugs to increase potency and therapeutic index.

Q.3 Explain in brief: **20**

(i) What is lead compound? Discuss lead modification in drug design and development.
(ii) Discuss disposition of drugs with respect to pharmacokinetics.

Q.4 Write the answer for the following: **20**

(i) What is lead compound? Discuss lead modification in drug design and development.
(ii) How will you synthesis Chlortetracycline? Give structure activity of Tetracycline.

Q.5 Explain the following: **20**

(i) Discuss Distribution and Elimination of drugs with respect to Pharmacokinetics.
(ii) Write a note on Semisynthetic Penicillin and Cephalosporin.

Q.6 Write short notes on the following: **20**

(i) Immunological assay.
(ii) LD_{50} and ED_{50}.
(iii) Chemotherapeutic agents.
(iv) Mechanism of blood clotting.

This question paper contains **6** printed pages]

NEPHR—86—2025

FACULTY OF SCIENCE AND TECHNOLOGY

M.Sc. (Second Year) (Third Semester) EXAMINATION

NOVEMBER/DECEMBER, 2025

ORGANIC CHEMISTRY

Paper SCHECT-1502

(Organic Synthesis-I)

(Monday, 15-12-2025) **Time : 2.00 p.m. to 5.00 p.m.**

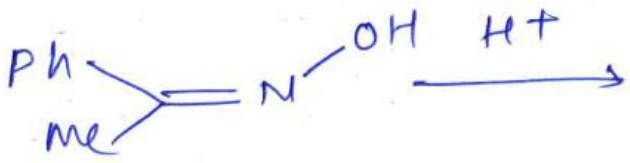
Time— 3 *Hours* *Maximum Marks*—80

N.B. :— (*i*) Question No. **1** is compulsory.

(*ii*) Solve any *three* questions from remaining five questions.

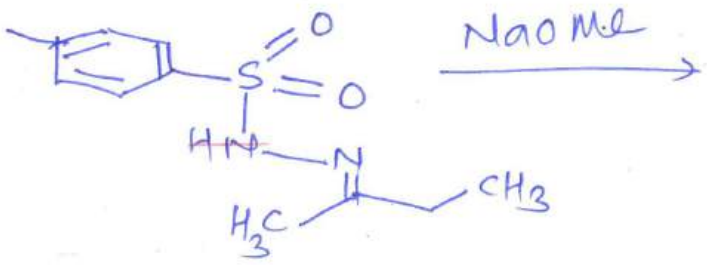
1. Solve the following questions : 20

(*a*) Predict the product of the following reaction with mechanism :



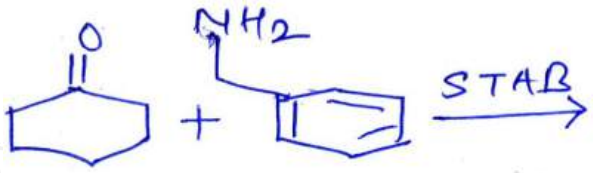
P.T.O.

(*b*) Complete the following reaction with mechanism :



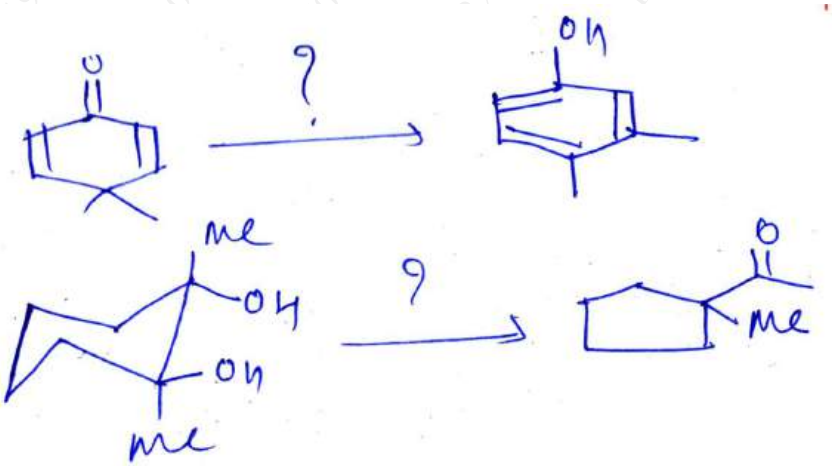
(*c*) Explain the Woodward hydroxylation with suitable example.

(*d*) Predict the product with mechanism :

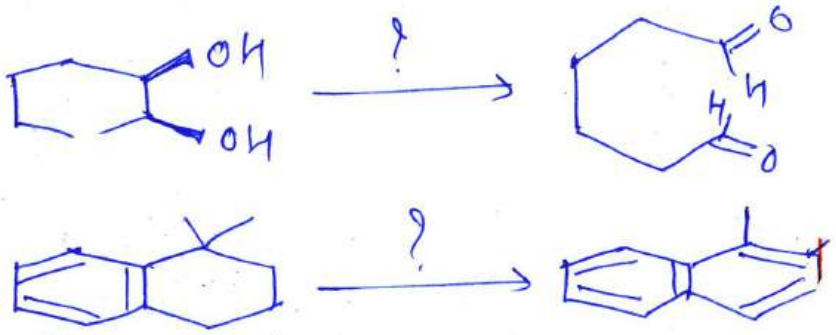


2. Answer the following questions : 20

(*a*) Write a suitable reagent and mechanism for the following conversion :



(*b*) Write a suitable reagent and mechanism for the following conversion :



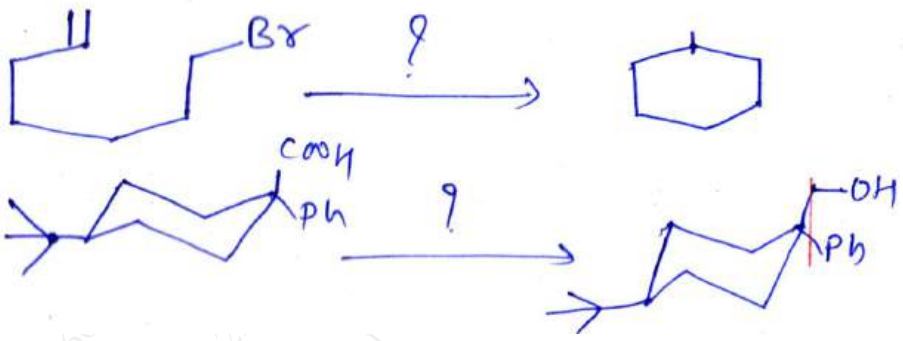
3. Solve the following questions : 20

(*a*) Discuss the following name reactions giving a suitable example with mechanism :

(*i*) Biginelli reaction

(*ii*) Etard's reaction.

(*b*) Suggest the suitable reducing agent in bringing out the following transformation with mechanism :



P.T.O.

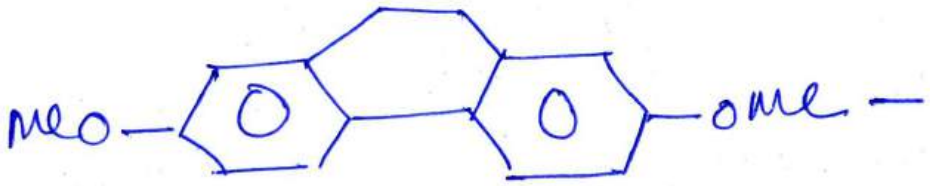
4. Discuss the following questions : 20

(*a*) Discuss the following rearrangements giving suitable example with mechanism :

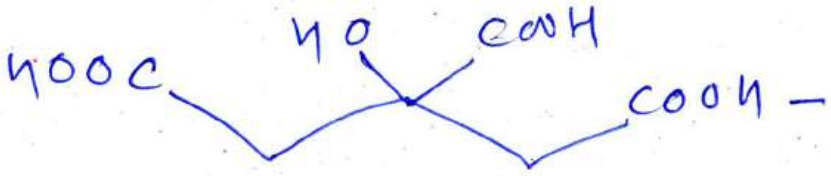
(*i*) Eschenmoser fragmentation

(*ii*) Neber rearrangement.

(*b*) Explain with mechanism for the preparation of the following target molecules :



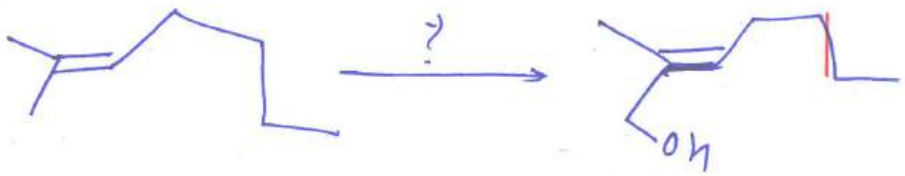
Ullmann reaction



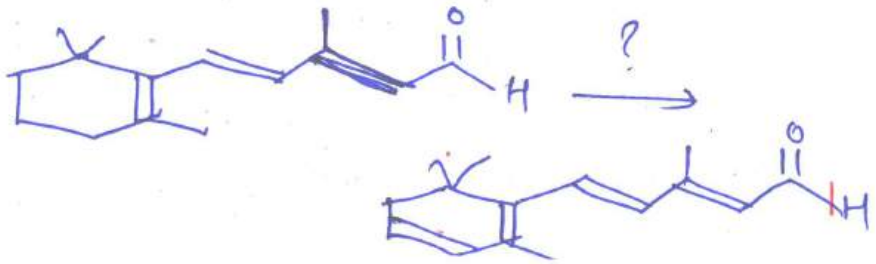
Benzillic acid rearrangement

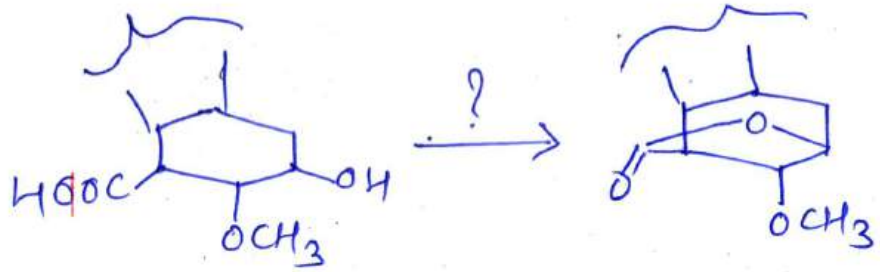
5. Write a suitable reagent with mechanism for the following conversion : 20

(*i*)



(*ii*)





P.T.O.

6. Write short notes on : 20

(*a*) Favorskii rearrangement

(*b*) Vilsmeier-Haack reaction

(*c*) Oxidation of allylic C–H bond using chloranil

(*d*) Polyphosphoric acid.

Total No. of Printed Pages:02

SUBJECT CODE NO- NEPHR-181-2025

FACULTY OF SCIENCE AND TECHNOLOGY

EXAMINATION WINTER 2025

M.SC. (SECOND YEAR) (SEM-III)

ORGANIC CHEMISTRY

SCHECT 1503 - NATURAL PRODUCT

[Time: 2:00 Hours] **[Max.Marks:40]**

"Please check whether you have got the right question paper."

N.B. 1) Q.NO.1 is Compulsory.
2) Solve any three Questions from Q.2 to Q.5

Q.1 Answer the following. **10**

a) Discuss the skeletal structure of Citral.
b) What are vitamins? Give its classification
c) Determine structure of Ring 'A' and Ring 'B' in cholesterol.
d) Explain Number and Nature of -OH groups in morphine.

Q.2 Answer the following **10**

a) What are alkaloids. Discuss the Presence of Phenanthrene nucleus in Morphine
b) What are Diels Hydro Carbon? Give their Method of Preparation. Write an account of occurrence of steroids in living organism.

Q.3 Answer the following **10**

a) Offer Synthesis of Vitamin A from β-ionone
b) Give an account on structure determination of Farnesol.

Q.4 Answer the following **10**

a) What are terpenoids? Give their Classification. Explain isoprene rule
b) Explain Nature and Point of attachment of Side chain in cholesterol.

Q.5 Answer the following **10**

a) Offer Synthesis for Camphoric and Camphoric acid
b) Offer synthesis for Testosterone

Q.6 solve the following **10**

a) Give an account on various deficiency diseases due to lack of vitamin.
b) Explain Presence of secondary -OH group in cholesterol.
c) write short note on Stereochemistry of quinine
d) Write a short note on Bile acid

This question paper contains **2** printed pages]

NEPHR—308—2025

FACULTY OF SCIENCE AND TECHNOLOGY

M.Sc. (NEP) (Second Year) (Third Semester) EXAMINATION

NOVEMBER/DECEMBER, 2025

ORGANIC CHEMISTRY

Paper SCHEET-1502

(Applied Chemistry)

(Monday, 22-12-2025) **Time : 2.00 p.m. to 5.00 p.m.**

Time—3 *Hours* *Maximum Marks*—80

N.B. :— (1) Question Number **1** is compulsory.

(2) Solve any *three* questions from remaining five.

(3) Simple calculator and log table is allowed.

1. (*a*) What is Supramolecular chemistry ? Explain the Supramolecular Hydrogen bonding interaction with suitable example. 20

(*b*) Explain the Hydrophobic effects in cyclodextrin complexes.

(*c*) What is the role of Forensic Scientist ?

(*d*) Write the classification of Poison on the basis of mode of action with appropriate examples.

P.T.O.

2. (*a*) Explain the mechanism of catalysis in supramolecular chemistry. 10

(*b*) What are the stages of crime scene investigation ? 10

3. (*a*) Explain the Langmuir-Blodgett films. 10

(*b*) What are the importances of physiological tests in forensic toxicology ? 10

4. (*a*) What is the principle of molecular association and organization biological macromolecules ? 10

(*b*) Explain the chemical preparation methods of polypyrrole. 10

5. (*a*) What is the Forensic analysis of Fire and Debris by instrumental methods ? 10

(*b*) Explain the Lethal drug analysis. 10

6. Write short notes on the following :

(*a*) Explain the molecular channels. 5

(*b*) What is the relation between the Piezoelectric and Pyroelectric materials ? 5

(*c*) What is the Forensic analysis of fire debris by instrumental methods ? 5

(*d*) Write down the importance of physiological tests in forensic toxicology. 5

Total No. of Printed Pages:1

SUBJECT CODE NO:- NEPHR-44-2025
FACULTY OF SCIENCE & TECHNOLOGY
EXAMINATION WINTER 2025
M.Sc.(SECOND YEAR) (SEM –IV)
(COMMON PAPER)
RESEARCH PUBLICATION ETHICS (NEPPE - 1002)

[Time: 2:00 Hours] **[Max.Marks:40]**

"Please check whether you have got the right question paper."

N.B. i) Question number 1 is compulsory.
ii) Solve any three questions from Question NO.2 to 6.

Q1 Explain: **5×2=10**
a) Nature of philosophy
b) Intellectual honesty
c) World association of medical editor's.
d) Open access publications.
e) Web of Science

Q2 a) What do you mean by philosophy? Gives the IR branches. **2x5=10**
b) Write an essay on scientific misconduct.

Q3 a) Define publication ethics? Why publication of research paper is important. Explain. **2x5=10**
b) SHERPA / ROMEO is an excellent online resource. Explain.

Q4 a) What are predatory Journals? How to identify a predatory Journals! **2×5=10**
b) What is impact Factor? How it calculate? Explain it with suitable example.

Q5 a) Give an account on violation of publications ethics. **2x5=10**
b) What is plagiarism? Describe different software of plagiarism.

Q6 Write short notes on: **4×2.5=10**
a) Scope of ethics
b) Salami slicing
c) Springer
d) h-index

This question paper contains **6** printed pages]

NEPHR—132—2025

FACULTY OF SCIENCE AND TECHNOLOGY

M.Sc. (Second Year) (Fourth Semester) EXAMINATION

NOVEMBER/DECEMBER, 2025

ORGANIC CHEMISTRY

Paper SCHECT-1551

(Organic Synthesis-II)

(Tuesday, 16-12-2025) **Time : 2.00 p.m. to 5.00 p.m.**

Time— 3 *Hours* *Maximum Marks*—80

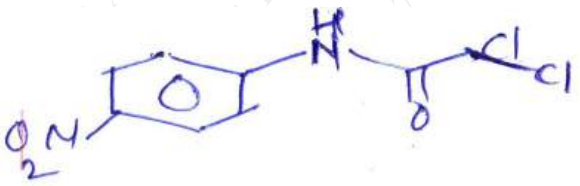
N.B. :— (*i*) Question No. **1** is compulsory.

(*ii*) Solve any *three* questions from the remaining five questions.

(*iii*) Simple calculator and log table is allowed.

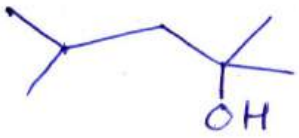
1. Solve the following questions : 20

(*a*) Using the concept of reversal of polarity, suggest suitable method for the synthesis of the following target molecule :



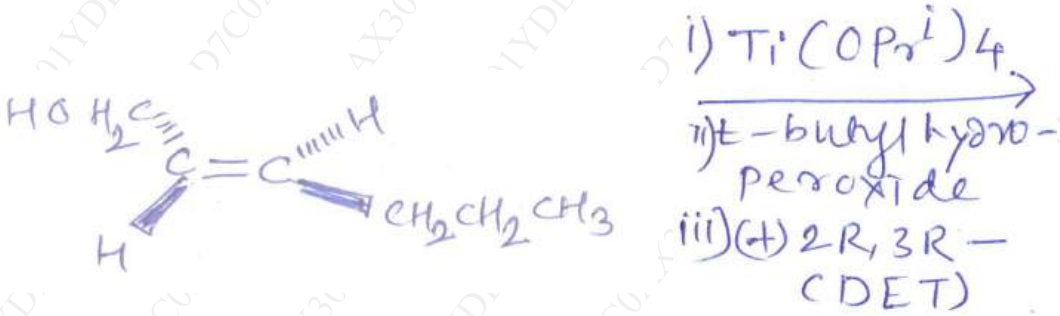
P.T.O.

(*b*) Using retrosynthesis analysis, suggest suitable method for the synthesis of the following :



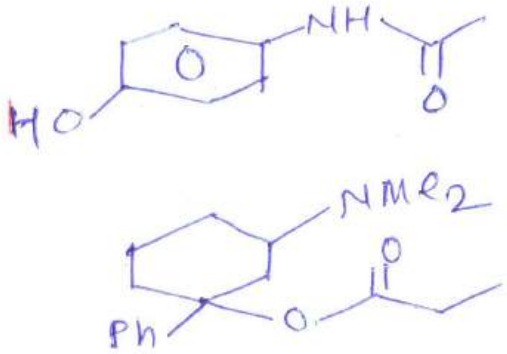
(*c*) Explain the applications of organomagnesium compounds with suitable examples.

(*d*) Predict the product using suitable mechanism :

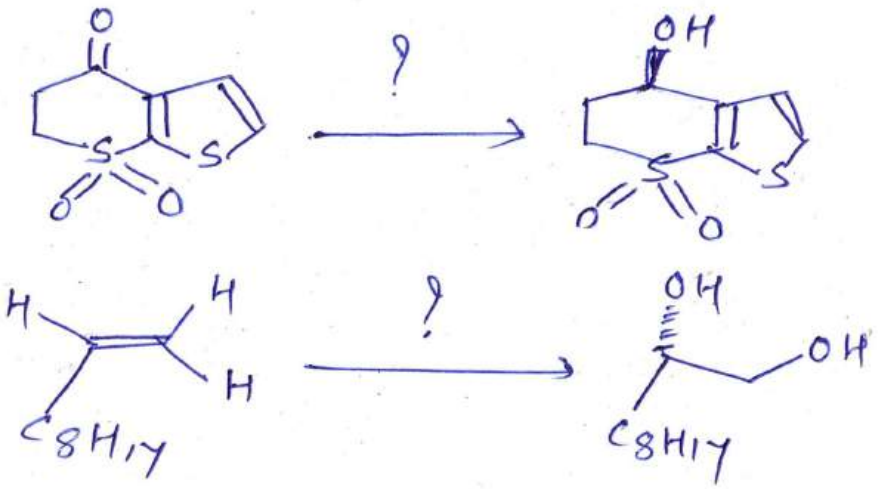


2. Solve the following questions : 20

(*a*) Using retrosynthesis analysis suggest a suitable method for the synthesis of the following :

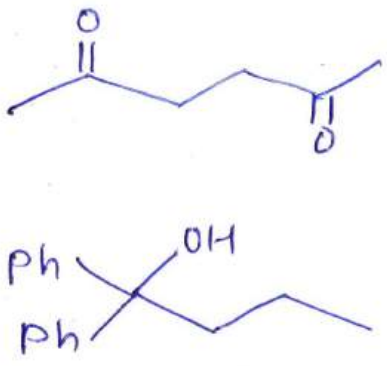


(*b*) Suggest a suitable reagent and mechanism for the following conversion :



3. Solve the following questions : 20

(*a*) Using retrosynthetic analysis suggest a suitable method for the synthesis of thed following target molecules :



P.T.O.

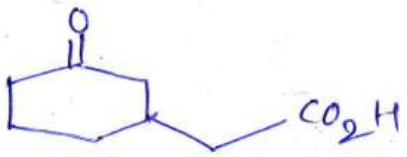
(*b*) Explain with suitable example :

(*i*) Ring closing metathesis

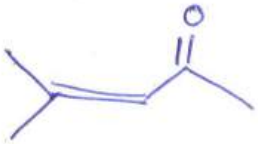
(*ii*) Organometallic C – H bond activation using Pd.

4. Answer the following questions : 20

(*a*) How will you synthesize the following target molecules using :

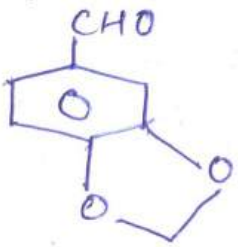


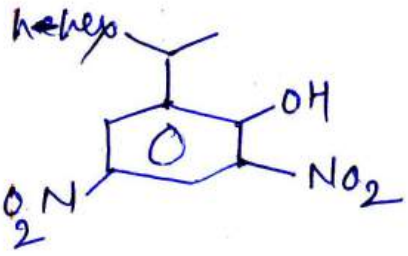
1, 5-difunctionalized compounds



α , β-unsaturated compound

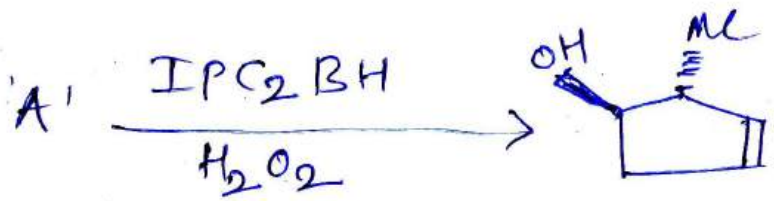
(*b*) Using retrosynthesis analysis suggest a suitable method for the synthesis of the following target molecules :

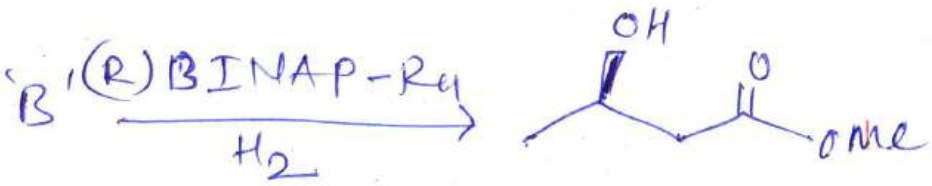




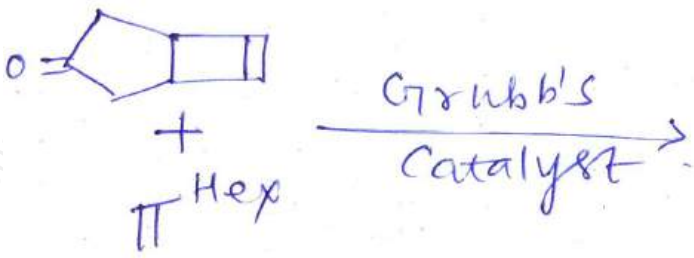
5. Discuss the following questions : 20

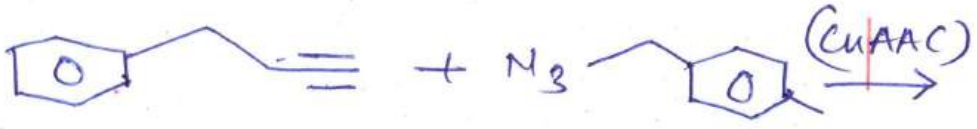
(*a*) Identity A and B in the following reaction and write down the suitable mechanism for the formation of product :





(*b*) Predict the product of the following using suitable mechanism :





P.T.O.

6. Write short notes on : 20

(*a*) N-heterocyclic carbene.

(*b*) Diastereoselective reactions involving Crams rule.

(*c*) Use of aliphatic nitro compounds inorganic synthesis.

(*d*) Reversal of polarity.