F–0656	Sub. Code
	7MCH2C1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2023

Second Semester

Chemistry

ORGANIC CHEMISTRY – II

(CBCS – 2017 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A $(10 \times 2 = 20)$

Answer **all** questions.

1. Define Eliel-Rho equation. Explain the terms involved.
2. What do you mean by conformational energy difference?
3. What are metastable ions? Give one suitable example.
4. Give one example each for any two different types of bending vibrations in IR spectra.
5. Give the spin-spin splitting pattern in ethylacetate with a neat sketch.
6. Define coupling constant. Illustrate with one example.
7. Predict the products of Birch reduction on benzoic acid and Justify.
8. Enlist any one role of phase transfer catalyst with example.
9. What are A/B trans steroids? Give one example.
10. Mention any two role of progesterone.

Part B (5 × 5 = 25)

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

11. (a) Describe the conformations that arise in n-butane due to rotation about C-C bond.

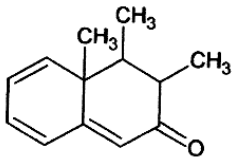
Or

(b) Depict the chair-chair inter-conversion in cyclohexane with a neat sketch.

12. (a) Briefly explain the principle of Mass spectroscopy with a neat sketch.

Or

(b) Calculate the λ max for the following compound



13. (a) Explain the role of shift reagents in simplification of complex proton NMR spectra.

Or

(b) Briefly explain the factors influencing chemical shift of protons with suitable example each.

14. (a) Describe with mechanism, homogenous and heterogenous catalytic reduction with one suitable example each.

Or

(b) Write a short note on hydroboration reactions.

15. (a) Briefly discuss the synthesis of cortisone.

Or

(b) Describe the synthesis of ergosterol in detail.

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

Answer any **three** questions.

16. Briefly discuss the stability of cyclohexane, 1,2-disubstituted cyclohexane and 1,3-disubstituted cyclohexane.

17. Discuss the factors influencing group frequencies in IR spectrum. Briefly describe the IR spectra of cinnamic acid.

18. Describe the basic principle of C-13 NMR spectroscopy. How the signals are assigned? What is meant by off resonance decoupling? When it becomes necessary?

19. Compare and contrast the role of Organo lithium and Gilman reagents in organic synthesis.

20. Briefly describe the chemistry and stereochemistry of cholesterol.

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F–0657	Sub. Code
	7MCH2C2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2023.

Second Semester

Chemistry

INORGANIC CHEMISTRY – II

(CBCS – 2017 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A $(10 \times 2 = 20)$

Answer **all** questions.

1. Low spin Tetrahedral complexes are rare. Explain.

2. Write the formulae for the following :

   (a) diaquabis (ethylenediamine) osmium (III) ion and

   (b) μ-chloro-bis [pentamminechromium (III)] chloride.

3. Trans-*effect* is usually observed in the reaction of metal complexes whereas cis effect does not. Explain.

4. What is meant by anation reaction?

5. Why does myoglobin bind oxygen more tightly than hemoglobin?

6. Define Bohr effect.

7. Write down the gas-shift reaction.

8. Activation of the C-H bond can be done through the oxidative addition. Explain.

9. What is meant by artificial radioactivity?

10. What information do you know from magic numbers?

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

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

11. (a) Write the relationship between overall and stepwise stability constants? How is stability determined by Job's method?

Or

(b) $[Ni(CN)_4]^{2-}$ is diamagnetic and square planar whereas $[Ni(C1)_4]^{2-}$ is paramagnetic and tetrahedral. Explain this on the basis of VBT.

12. (a) Explain the mechanism of acid hydrolysis reaction.

Or

(b) Discuss the polarization theory of trans- effect.

13. (a) Explain the structure of ferridoxin. In what ways, it differs from rubredoxin?

Or

(b) Write an essay on *in-vivo* and *in-vitro* nitrogen fixation.

14. (a) Explain the mechanism of hydroformyaltion of olefins using Rhodium complex as catalyst.

Or

(b) Discuss the mechanism of oxo process.

15. (a) What is Nuclear fusion? How does it differ from nucear fission.

Or

(b) Write a note on stellar energy.

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

Answer any **three** questions.

16. (a) Using CFT, explain the spinel and inverse spinel structures of the mixed oxides.

(b) What is meant by CFSE? Calculate CFSE of d^5 low spin octahedral complex. (5+5)

17. (a) Write the mechanism of SNiCB reaction with suitable examples.

(b) Discuss outer sphere electron transfer reactions with suitable examples. (5+5)

18. Write the structure of myoglobin. Describe the Perutz mechanism of low spin and high spin "trigger" in hemoglobin system.

19. Compare and contrast between homogeneous and heterogeneous catalyses.

20. (a) What is breeder reactor? Mention its types? Explain the function of fast breeder reactor.

(b) Discuss the applications of radioactive isotopes in chemical investigation and agricultural fields. (5+5)

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F–0658

Sub. Code
7MCH2C3

M.Sc. DEGREE EXAMINATION, NOVEMBER 2023

Second Semester

Chemistry

PHYSICAL CHEMISTRY — II

(CBCS – 2017 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. What is rate law?

2. In a first order reaction, it takes the reactants five minutes to be 50% completed. Calculate the rate constant of the reaction.

3. Give the selection rule of microwave rotational spectrum.

4. What is Einstein coefficient?

5. Calculate the moment of inertia of CO if the bond length is 1.128 Aº.

6. Write about the source of Raman spectroscopy.

7. How is NQR used in studying the nature of chemical bond?

8. Predict the ESR spectrum of naphthyl radical.

9. Write down all symmetry elements of ammonia.

10. Distinguish between Bethe notation and Mulliken notation.

Part B (5 × 5 = 25)

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

11. (a) Discuss the Arrhenius theory of bimolecular reactions.

Or

(b) Discuss in detail the RRKM theory of unimolecular reactions.

12. (a) Explain the following terms :

(i) Fermi Resonance and

(ii) Isotope effect (2 + 3)

Or

(b) Discuss the principle of FT IR spectroscopy.

13. (a) Write a note on Fortrat diagram.

Or

(b) Discuss the important applications of PES.

14. (a) Explain the hyper fine splitting in ESR spectroscopy.

Or

(b) Discuss the applications of NQR spectroscopy.

15. (a) Distinguish between reducible and irreducible representations.

Or

(b) Establish all symmetry elements present in NH_3 molecule.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. (a) Explain the mechanism of thermal $H_2 - Br_2$ reaction and derive the rate law.

    (b) What is explosive reaction? Discuss the mechanism of H_2-O_2 explosive reaction. (5 + 5)

17. (a) Discuss the instrumentation of Microwave spectrometer.

    (b) Discuss the rotational spectra of rigid diatomic molecules. (5 + 5)

18. (a) Explain stoke, antistoke and Rayleigh phenomenon in Raman Spectroscopy.

    (b) Draw and explain PES diagram of N_2 and O_2. (5 + 5)

19. (a) Explain the terms Zero field splitting and Kramer's degeneracy.

    (b) Discuss the mechanism of different relaxation processes in NMR spectroscopy. (5 + 5)

20. Using group orthogonality theorem, derive the character table for C_{3v} point group.

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F–0659	Sub. Code
	7MCH3C1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2023

Third Semester

Chemistry

ORGANIC CHEMISTRY – III

(CBCS – 2017 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A $(10 \times 2 = 20)$

Answer **all** the questions.

1. Mention the role of peracids in Baeyer-Villeger rearrangement reactions.

2. How will you distinguish Stevens rearrangement from Sommelet-Hauser rearrangement?

3. Write an example of intramolecular Aldol condensation.

4. What is Grignard reagent? Give one method of preparation and its important application.

5. Give one example each for bicyclic monoterpene and acyclic monoterpene containing oxygen.

6. What happens when α-terpene is treated with alcoholic sulphuric acid?

7. Explain the term 'synthons' with suitable example.

8. Write a brief note on starting material in a synthesis.

9. Write a brief note on photosensitization.

10. Define Conrotatory and disrotatory motions.

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

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

11. (a) Describe the mechanism of Fries rearrangement with suitable examples.

Or

(b) Write a note on Wagner-Meerwin and Wolff rearrangement reaction.

12. (a) What is the stereochemical outcome in the addition of carbenes to cis- and trans-2-butenes? Explain.

Or

(b) Explain how Aldol condensation mechanism is exploited in Robinsons Annelation reaction.

13. (a) Schematically illustrate the biosynthetic route of monoterpenes from mevalonic acid.

Or

(b) Briefly describe the various classifications of terpenoids with suitable examples.

14. (a) What is relay approach to total synthesis? Explain with an example.

Or

(b) Briefly explain the role of activating groups, protecting groups in organic synthesis with suitable examples each.

15. (a) Explain, with the help of Jablonski diagram, the various photophysical processes of an excited state.

Or

(b) Construct the correlation diagram for [2+2] cycloaddition and state the conditions under which the addition occurs.

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

Answer any **three** questions.

16. Write a short note on:

(a) Arndt-Eistert reaction

(b) Vilsmeier- Haack reaction. (5+5)

17. Illustrate the mechanism and applications of Wittig reaction and its modification.

18. Outline the steps involved in the synthesis of α-pinene from trans-norpinic acid.

19. Devise a documented synthetic scheme for trans-9-methyl-1-decalone.

20. Write notes on:

(a) photooxidations and

(b) di-π-methane rearrangement. (5+5)

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F–0660

Sub. Code
7MCH3C2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2023

Third Semester

Chemistry

INORGANIC CHEMISTRY - III

(CBCS – 2017 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A $(10 \times 2 = 20)$

Answer **all** questions.

1. In what ways forbidden transition differ from allowed transitions?

2. What is recoil energy in Mossbauer spectroscopy?

3. Predict ^{31}P-NMR spectrum for PCl_3F_2.

4. What is Laporte selection rule?

5. Give the uses of tetraethyl lead.

6. What is EAN rule?

7. Write down the electronic configuration of Thorium (z = 90).

8. ‘ f ’ block elements are placed separately in modern periodic table. Why?

9. What is meant by Naked cluster? Give an example.

10. How are poly acids classified?

Part B (5 × 5 = 25)

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

11. (a) Explain the terms Doppler shift and Doppler peak broad.

Or

(b) Distinguish the following linkage isomers by IR spectroscopy

(i) M-CNO and M-NCO;

(ii) M-NO and M-ON

12. (a) A tetrahedral complex of Co (II) exhibits two absorption bands in the visible range at 81240 cm^{-1} and a doublet peak (17180 and 18600 cm^{-1}). Determine its spectral parameters 10 Dq and β (Given 15 B_0 = 14500 cm^{-1})

Or

(b) Write a note on Shift reagents.

13. (a) Discuss the nature of bonding in mononuclear metal carbonyls.

Or

(b) Mention the ores of beryllium. How is beryllium extracted from its ore?

14. (a) Describe the extraction of lanthanides from solvent extraction method.

Or

(b) How does Uranium occur in nature? How is it extracted from fission products?

15. (a) What is meant styx numbers? Calculate the styx number for B_4H_{10} and B_5H_{11}.

Or

(b) Discuss the structure and bonding of ferrocene.

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

Answer any **three** questions.

16. (a) Explain the MB spectra of $Fe(CO)_5$ and $Fe_2(CO)_9$.

(b) Describe the use of IR and Raman spectra to detect inter and intra molecular hydrogen bonding. (5+5)

17. (a) Explain Contact shift and Pseudo Contact shift with suitable examples

(b) How will you determine the rate constant of exchange reaction by NMR method? (5+5)

18. Describe the isolation, purification and properties of selenium.

19. Discuss in detail the similarities and dissimilarities between later Lanthanides and Actinides

20. (a) How are carboranes classified into closo, nido and arachno carboranes?

(b) Draw the structure of various isoemers of $C_2B_{10}H_{12}$. (5+5)

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F–0661	Sub. Code
	7MCH3C3

M.Sc. DEGREE EXAMINATION, NOVEMBER 2023

Third Semester

Chemistry

PHYSICAL CHEMISTRY – III

(CBCS – 2017 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A $(10 \times 2 = 20)$

Answer **all** questions.

1. Explain internal conversion and inter system crossing.
2. Define phosphorescence.
3. What are linear operators?
4. Explain vanishing commutators.
5. Define eigan value and eigan function.
6. Explain degeneracy.
7. Explain the necessity for approximation methods
8. What are Hermite polynomials?
9. Explain flow technique.
10. What do you understand by the term catalysis?

Part B (5 × 5 = 25)

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

11. (a) What is photosensitization? Explain the mechanism by taking an example.

Or

(b) Describe and discuss the Jablonski diagram for depicting various photophysical processes.

12. (a) State and explain the postulates of quantum mechanics.

Or

(b) Explain

(i) Compton effect

(ii) Heisenberg's uncertainty principle.

13. (a) Derive time independent Schrodinger wave equation.

Or

(b) Explain orthogonality and normalization.

14. (a) Setup the Schrodinger wave equation for simple harmonic oscillator.

Or

(b) Using the first order time-independent perturbation theory solve the Schrodinger wave equation for the ground state energy of helium atom.

15. (a) Discuss the theory of heterogeneous catalysis.

Or

(b) Explain the temperature jump method in fast reactions.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Discuss the kinetics and derive an expression for the H_2 –Cl_2 photochemical reaction.

17. Derive the quantum mechanical operator for kinetic energy and potential energy.

18. Derive an expression for the energy of a rigid rotator using the Schrodinger wave equation.

19. Using HMO calculations determine the delocalization energy of butadine.

20. Derive an expression for the coefficient of thermal conductivity.

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F–0662	Sub. Code
	7MCH3E1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2023.

Third Semester

Chemistry

Elective – PHARMACEUTICAL CHEMISTRY

(CBCS – 2017 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A $(10 \times 2 = 20)$

Answer **all** questions.

1. Define bioisoterism with suitable example.

2. Give any two requirements of a drug.

3. Mention the use of chloramphenicol and chloroquine.

4. What do you mean by β - lactam antibiotics?

5. Enlist the role of antineoplastic agents taking any one example.

6. What are local anti-infective drugs? Give one example.

7. Draw the structure and mention the use of methyldopa.

8. Explain the term cardiovascular diseases.

9. Draw the structure of paracetomol.

10. List out the ideal characteristics of anaesthetic agent.

Part B (5 × 5 = 25)

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

11. (a) Briefly explain the concept of drug–receptor interactions.

Or

(b) Discuss the factors involved in pharmacodynamics.

12. (a) Discuss the structure-activity relationship of Chloramphenicol.

Or

(b) Describe the structural features and the activity of erythromycin.

13. (a) Compare and contrast the mode of action of hypnotics and sedatives

Or

(b) Discuss the synthesis of chlorambucil. Mention its uses and side – effects.

14. (a) Discuss the synthesis of sorbitrate. Mention its use and side effects of extensive use.

Or

(b) Write a note on inhibitor drugs of peripheral sympathetic function.

15. (a) Write a short note on the therapeutic action of captopril and sodium nitroprusside

Or

(b) Discuss the merits and demerits of volatile and non-volatile anaesthetics in general.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Write short notes on various physico–chemical parameters regarding drug receptor interactions

17. Briefly describe the structural features, structure activity relationship and synthesis of chloramphenicol.

18. Define neurotransmitters. Explain in detail neurochemistry of mental diseases.

19. Discuss the following:

    (a) Synthesis of amyl nitrate and atenolol.

    (b) Local anti-infective drugs

20. Outline the synthesis and therapeutic action of Nifedipine, and hydralazine

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F–0663

Sub. Code
7MCH4C1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2023

Fourth Semester

Chemistry

INSTRUMENTAL METHODS OF ANALYSIS

(CBCS – 2017 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Define variance.

2. Round 6.35427 to

   (a) two figures and

   (b) five figures

3. Digesting the precipitate an important factor for gravimetric measurements. Explain.

4. How many number of crystals per unit volume of mother liquor If the nucleation rate is Bo = 2* 10^8nuclei / Ls and the induction time T = 40 seconds?

5. What are the Advantages to measuring the difference current?

6. Give any two differences between galvanic cell and an electrolytic cell.

7. What are dynamic and static TGA?

8. Define procedural decomposition temperature.

9. Define Beer Lambert law.

10. Distinguish between Turbidimetry and flourimetry.

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

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

11. (a) Define accuracy and precision. How are precision expressed for a set a data?

Or

(b) Write a note on student's F" test.

12. (a) Mention the applications of gravimetric methods.

Or

(b) Discuss the technique of precipitation from homogeneous solution.

13. (a) Explain the different types of amperometric curves obtained in amperometric titration.

Or

(b) Discuss the separate the metal ions using gravimetric method.

14. (a) Outline the factors affecting TG curves.

Or

(b) Explain the thermal behavior of zinc hexaflourosilicate.

15. (a) Discuss the principle and instrumentation of Flame photometry.

Or

(b) Determine the amount of copper using colorimetry.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. (a) The following masses were recorded for 6 different U.S quarters (all given in grams) :

5.683, 5.549, 5.548, 5.552, 5.620, 5.536

Report the mean, median, range, standard deviation, and variance for these data

(b) How are errors classified? In what ways they are minimized? (6+4)

17. (a) Define co-precipitation and post precipitation How are they distinguished?

(b) Write a note on colloidal precipitates. (6+4)

18. Describe the principle and working of

(a) stripping voltammetry and

(b) chronopotentiometry (5+5)

19. (a) Discuss the TG and DTA curves of calcium oxalate monohydrate in air and nitrogen atmosphere.

(b) Outline the principle and block diagram of DSC. (5+5)

20. Describe the principle, instrumentation and applications of AAS.

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F–0664	Sub. Code
	7MCH4E1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2023

Fourth Semester

Chemistry

Elective – NANO CHEMISTRY

(CBCS – 2017 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Give the classification of Nanomaterials.
2. What is known as nanomaterials?
3. What are carbon nanotubes?
4. Explain fullerenes with an example.
5. What are carbon clusters?
6. Define organic nanomaterials.
7. What is scanning electron microscopy used to study?
8. How does TEM produce an image?
9. What are DNA knots?
10. What are nano pipettes?

Part B (5 × 5 = 25)

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

11. (a) Explain the hydrothermal process in the synthesis of nanomaterials.

Or

(b) Describe the sol-gel technology in the synthesis of nanomaterials.

12. (a) Explain

(i) Nanorods

(ii) Nanofibres

Or

(b) Describe the application of nanomaterials in the field of textiles.

13. (a) Write short notes on discovery of C_{60}.

Or

(b) Write about the property of Super conductivity in C_{60}.

14. (a) Discuss the principle and applications of ESCA.

Or

(b) Describe the principle and applications of transmission electron microscopy.

15. (a) Give a brief account of nanoparticle mediated transfection.

Or

(b) Write short note on self-assembled nano transistors.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Discuss the synthesis of nanomaterials using
    (a) microorganisms
    (b) hydrodynamic cavitation

17. Describe the applications of nanomaterials in the fields of
    (a) pharmaceuticals
    (b) medical
    (c) energy
    (d) environment.

$(4 \times 2.5 = 10)$

18. Give the methods of preparation of
    (a) nano TiO_2
    (b) nano ZnO
    (c) nano CdO
    (d) CdS (4×2.5)

19. Discuss the principle and applications of
    (a) SEM
    (b) AFM $(5 + 5)$

20. Give a detailed account of
    (a) protein nano array
    (b) molecular diodes. $(5 + 5)$

F–0665	Sub. Code
	7MCH4E2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2023.

Fourth Semester

Chemistry

Elective – CORROSION CHEMISTRY

(CBCS – 2017 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A $(10 \times 2 = 20)$

Answer **all** questions.

1. Iron corrodes faster than aluminium, even though iron placed below aluminium in electrochemical series. Why?

2. What is electrochemical (EMF) series?

3. What do you know from underground corrosion?

4. Define the term pitting corrosion.

5. What are the conditions from which protective coating protects?

6. Define the term cladding.

7. How do you find the emf of a battery?

8. Define the term Power density.

9. What are the advantages of fuel cells?

10. Define the term limiting current density.

Part B (5 × 5 = 25)

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

11. (a) Describe the control methods of pitting and dezincification.

Or

(b) Distinguish between Chemical corrosion and electrochemical corrosion.

12. (a) Write a note on Stress corrosion.

Or

(b) Explain sacrificial anode method for corrosion control.

13. (a) What is metallic coating? In what ways it is superior over other coating?

Or

(b) What is paint? Mention the requirements of a good paint.

14. (a) A battery is connected in series with a variable resistor and an ammeter. When the resistance of the resistor is 10 Ω the current is 2.0 A. When the resistance is 5 Ω the current is 3.8 A. Find the emf and the internal resistance of the battery.

Or

(b) What are the criteria chosen for selection of cathodes and anodes?

15. (a) Explain the terms limiting current and limiting density.

Or

(b) Write a note on mercury porosimetry.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. (a) Write a note on cathodic protection.

    (b) Explain the factors that affect on the rate of corrosion (5+5)

17. Give a detailed account on the control methods and mechanism of Inter-granular and soil corrosion.

18. What is meant by electroplating? Mention the factors affecting electroplating. Give its applications.

19. Discuss the different types electrolytes used in battery.

20. (a) Illustrate the thermodynamic parameters and efficiency of any two fuel cells

    (b) Explain the construction and working of solid polymer fuel cell. (6+4)

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F–0666	Sub. Code
	7MCH4E3

M.Sc. DEGREE EXAMINATION, NOVEMBER 2023.

Fourth Semester

Chemistry

Elective – GREEN CHEMISTRY

(CBCS – 2017 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is eco efficiency?

2. What are green products?

3. Define the term green chemistry

4. Name some International organisation for green chemistry.

5. What are heavy metals? Give any two properties of them.

6. Give the adverse health effect imposed by lead.

7. What is meant by super critical fluids? Give examples

8. How are ionic liquids synthesized?

9. List out the types of phase transfer catalysts.

10. Give the limitations of ultrasound assisted synthesis.

Part B (5 × 5 = 25)

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

11. (a) Explain the need for green chemistry in environmental related problems.

Or

(b) Explain how pollution can be controlled and prevented.

12. (a) Explain any five principles of green chemistry.

Or

(b) Discuss atom economy by taking suitable examples.

13. (a) Write the general precautions to be followed to prevent the environment from heavy metals like uranium and mercury.

Or

(b) Describe briefly the health impacts of tellurium and selenium.

14. (a) Illustrate how benzoin condensation is carried out in a green synthesis method.

Or

(b) Write a note on,

(a) Reaction in ionic liquids,

(b) Super critical polymerization.

15. (a) Explain how curtius rearrangement carried out using ultrasound technique.

Or

(b) Give an account on polymer supported catalysts.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Discuss the following, (4+3+3)

    (a) Education on green chemistry (4)

    (b) Green methods (3)

    (c) Recycling of waste (3)

17. Write notes on scope and inception of green chemistry.

18. (a) Discuss the methods involved in removing arsenic from water.

    (b) Give a note on health impacts of beryllium and cobalt. (5 + 5)

19. Discuss the importance in choosing a starting materials, reagent, solvent and catalyst while designing a green synthesis.

20. (a) Discuss the advantage and specific effects of microwaves in microwave assisted green synthesis. (7)

    (b) Explain how benzamide is hydrolysed using microwave. (3)

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F–0667

Sub. Code
7MCH4E4

M.Sc. DEGREE EXAMINATION, NOVEMBER 2023

Fourth Semester

Chemistry

Elective – MOLECULAR PHOTOCHEMISTRY

(CBCS – 2017 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A $(10 \times 2 = 20)$

Answer **all** questions.

1. What is meant by intersystem crossing in photochemical reaction? Give an example.

2. Define the term fluorescence emission.

3. What is photo oxidation reaction? Give an example.

4. What is photo dimerisation?

5. What are photo substitution reaction? Give an example.

6. What you mean by photo redox reaction? Give an example.

7. What is Barton reaction?

8. What are photo cleavages?

9. What is Ferrioxalate actinometry?

10. Define LASER.

Part B (5 × 5 = 25)

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

11. (a) What is fluorescence? Explain the structure of fluorescence.

Or

(b) Explain the photophysical kinetics of unimolecular processes.

12. (a) Describe in detail the photochemical reduction reaction.

Or

(b) Explain cyclo addition of heptafulvalence and tetracyano ethylene with M.O. interactions.

13. (a) Explain the photo rearrangement reaction with transition metal complexes and give suitable example.

Or

(b) Write a note on photochemistry of metallocenes.

14. (a) Write the photochemical isomerisation and addition reactions with suitable examples.

Or

(b) Explain the photo-Fries rearrangement of ethers and anilides.

15. (a) Describe the experimental technique of photochromic actinometers in photochemistry.

Or

(b) List out the applications of the LASER.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain the photophysical phenomena using Jablonski diagram.

17. Discuss the following with suitable example

    (a) Woodward – Haffman rules.

    (b) Chemiluminescence. (5+5)

18. Describe the inorganic photochemistry involved in Photochemical conversion and storage of solar energy.

19. Write short notes on

    (a) Hoffmann-Loefller – Freytag reaction.

    (b) Di-π-Methan rearrangement. (5+5)

20. Discuss the following experimental technique in photochemistry.

    (a) Uranyl oxalate actinometer

    (b) Reinecke's salt actinometer. (5+5)

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