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PGIVS-015-B-21
M.Sc. IV Semester (CBCS) Degree Examination
ORGANIC CHEMISTRY
Recent Methods in Organic Synthesis
Paper : HCT 4.1
(Old and New Syllabus)

Time : 3 Hours

Maximum Marks : 80

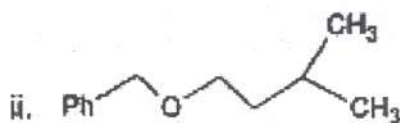
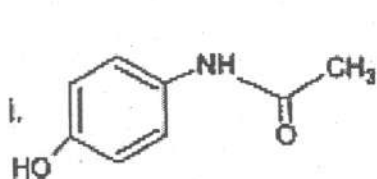
Instructions to Candidates:

- 1) Answer **All** questions.
- 2) **All** questions carry equal marks.

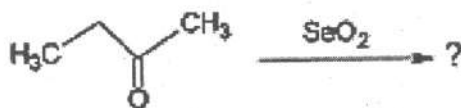
Answer any **Eight** of the following:

(8×2=16)

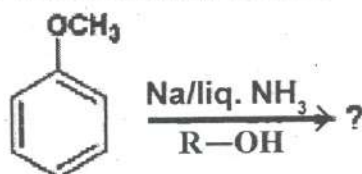
1. a) Write the synthons and synthetic equivalents for the following target molecules:



- b) Define the term protecting group. Mention its salient features.
- c) Predict the product with suitable mechanism for the following:



- d) Write the structure of PCC and give its mechanism by taking suitable example.
- e) Give any one method for the preparation of 9-BBN. Mention its applications.
- f) Predict the product with suitable mechanism for the following:



- g) What is Simon-Smith reaction? Illustrate its mechanism using appropriate example.
 - h) Explain functional group interconversion with an example.
 - i) Write the mechanism of Hoffmann-Löffler-Freytag reaction.
 - j) Write the chemical equation for action of sodium cyanoborohydride on acetophenone oxime.
2. a) Explain the principle for protection of amino group. Discuss any three methods for the protection and deprotection of amino groups.
- b) Illustrate with appropriate examples two group C-C disconnection with reference to Diels-Alder reaction and Michael addition.
- c) Give the retrosynthetic analysis and the corresponding synthesis of the followings:
- i) Benzocaine
 - ii) Prelog-Djerassi lactone.

(OR)

- c) Illustrate the use of the followings as protecting group in organic synthesis using at least two examples in each case:
- i) Trityl group
 - ii) BOC group
 - ii) CBZ group. [5+5+6=16]
3. a) What is Sharpless epoxidation? Explain its mechanism using suitable example. Mention its applications.
- b) Explain any two applications of Thallium (III) nitrate and DDQ reagents in organic synthesis.
- c) Write notes on:
- i) Oppenauer oxidation and its applications.
 - ii) KMnO_4 and its applications.

(OR)

c) Write a note on:

iii) Wacker oxidation

iv) Ozonolysis.

[5+5+6=16]

4. a) Give the preparation of Wilkinson catalyst. Illustrate its mechanism by taking suitable example. Mention its applications.
- b) Discuss the applications of Meerwein-Ponndorf-Verley reduction and Wolf-Kishner reduction in synthetic organic chemistry.
- c) What are Clemmensen and Rosenmund reductions? Illustrate their mechanism using suitable examples. Differentiate between these reagents.

(OR)

c) Compare the mechanism of reduction of ketone with LAH, NaBH_4 and BH_3 by taking suitable example.

[5+5+6=16]

5. a) What is Mitsunobu reaction? Explain its mechanism by taking appropriate example. Mention its applications in organic synthesis.
- b) Write an account of Huisgen-1,3-dipolar cycloaddition reactions.
- c) Illustrate the mechanism and applications of the followings:
- i) Heck reaction ii) Dieckmann condensation.

(OR)

c) Write notes on:

i) Suzuki coupling and its applications.

ii) Robinson annulations and its applications.

[5+5+6=16]

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PGIVS-017-B-21
M.Sc. IV Semester (CBCS) Degree Examination
ORGANIC CHEMISTRY
Medicinal Chemistry
Paper : SCT - 4.2
(Old and New Syllabus)

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates:

1. *Answer ALL Questions.*
2. *All Questions carry Equal Marks.*

Answer any **EIGHT** of the following.

(8×2=16)

1.
 - a) What are oral contraceptives? Give an example.
 - b) Write biological activity and mode of action of diuretic drugs.
 - c) Differentiate between narcotic and non - narcotic drugs.
 - d) Give the synthesis of sulfamazine.
 - e) Formulate the synthesis of amethopterin.
 - f) Write the structure and uses of amoxicillin.
 - g) Explain the biological importance of vitamins.
 - h) Give the structure and uses of ascorbic acid.
 - i) Write the structure of prostaglandin PGE1 and give its systematic name.
 - j) State the concept of receptors.

2.
 - a) What is meant by pharmacokinetics? Explain the steps involved in it.
 - b) Write an account on SAR studies of vasodilators.
 - c) Describe the relationship of chemical structure and biological activity of cardiac drugs.

(OR)

- c) Write briefly on history, nomenclature and literature of organic medicinal compounds.
(5+5+6=16)

3. a) Give the synthesis and mode of action of sulfadiazines.
b) Write the synthesis of diisopropylamine and discuss its mode of action.
c) Write an account of non - steroidal anti - fertility drugs.

(OR)

- c) Write briefly on computer aided drug design. (5+5+6=16)

4. a) Give the synthesis and mode of action of nitrogen mustards.
b) Discuss the structural features and uses of norfloxacin and rifamycin.
c) Discuss the stereochemistry and biological activity of streptomycin.

(OR)

- c) Write the synthesis and mode of action of the followings :

i) Chlorobucil.

ii) Pyrimidines.

(5+5+6=16)

5. a) Give the structure and describe the biological activity of riboflavin and vitamin - A.
b) Write an account of transcription and translation.
c) Write briefly on genetic code base sequencing in nucleic acids.

(OR)

- c) Discuss the structure and biological activity of thiamine and vitamin B12. (5+5+6=16)

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PGIVS-016 B-21

M.Sc. IV Semester (CBCS) Degree Examination

CHEMISTRY/ORGANIC CHEMISTRY

Organic Chemistry - IV/Selected Topics in Organic Chemistry

(Common to Chemistry & Organic Chemistry)

Paper - HCT/SCT - 4.2

(Old and New Syllabus)

Time : 3 Hours

Maximum Marks : 80

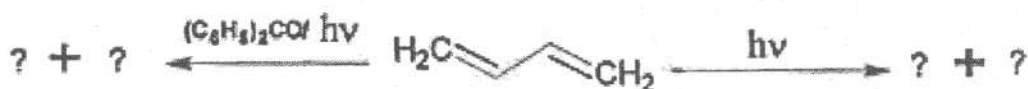
Instructions to Candidates:

1. Answer all questions.
2. All questions carry equal marks.

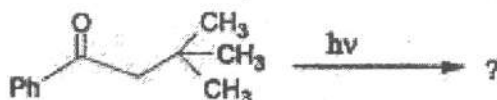
Answer any **Eight** of the followings.

(8×2=16)

1. a. Illustrate Norrish type I reaction with suitable example.
b. Predict the product :



- c. Write Woodward - Hoffmann rules for electrocyclic reactions.
 - d. What is Ene reaction? Give an example.
 - e. Give two synthetic applications of organosilicon compounds.
 - f. How is pentacarbonyl iron prepared in the laboratory? Give its applications.
 - g. What are supramolecules? Write its synthetic applications.
 - h. Write the advantages of ionic liquids used in organic synthesis.
 - i. Draw the molecular orbital diagram of 1,3-butadiene and label HOMO and LUMO under thermal and photochemical conditions along with its symmetry.
 - j. Explain the Phenomenon of optical pumping with suitable example.
2. a. Predict the product with possible mechanism.



- b. Explain Di-pi methane rearrangement with mechanism.
- c. Write a note on :
 - i. Cis - trans isomerisation.
 - ii. Photo rearrangement of benzene and its derivatives.

(OR)

- c. With the help of Jablonski diagram, explain the following terms :
 - i. Internal conversion
 - ii. Inter system crossing
 - iii. Fluorescence
 - iv. Phosphorescence. (5+5+6=16)

- 3. a. Explain cheletropic reaction taking suitable examples.
- b. Illustrate with examples [1,3] hydrogen shift is photochemically allowed whereas, [1,5] hydrogen shift is thermally allowed process.
- c. Explain Woodward - Hofmann rules for cycloaddition reactions of both [2+2] and [4+2] electron systems using FMO approach.

(OR)

- c. Discuss the mechanism of ortho - and para - Claisen rearrangement. (5+5+6=16)
- 4. a. Discuss the preparation and applications of organocadmium reagents in organic synthesis.
- b. Explain synthetic applications of octacarbonyldicobalt.
- c. What are Grignard reagents? How are they prepared in the laboratory? Discuss their synthetic applications.

(OR)

- c. Write notes on :
 - i. Organocopper compounds.
 - ii. Organophosphorous compounds. (5+5+6=16)
- 5. a. Explain Leuckhardt's reductive amination of lactones.
- b. Give an account of polymer supported organic synthesis.
- c. Write note on the following :
 - i. Microwave assisted oxidation of alcohols.
 - ii. Synthesis of Ibuprofen by BHC approach.

(OR)

- c. Give a brief account on use of phase transfer catalyst and crown ethers in organic synthesis. (5+5+6=16)

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PGIVS-017-B-21
M.Sc. IV Semester (CBCS) Degree Examination
ORGANIC CHEMISTRY
Medicinal Chemistry
Paper : SCT - 4.2
(Old and New Syllabus)

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates:

1. *Answer ALL Questions.*
2. *All Questions carry Equal Marks.*

Answer any **EIGHT** of the following.

(8×2=16)

1.
 - a) What are oral contraceptives? Give an example.
 - b) Write biological activity and mode of action of diuretic drugs.
 - c) Differentiate between narcotic and non - narcotic drugs.
 - d) Give the synthesis of sulfamazine.
 - e) Formulate the synthesis of amethopterin.
 - f) Write the structure and uses of amoxicillin.
 - g) Explain the biological importance of vitamins.
 - h) Give the structure and uses of ascorbic acid.
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 - j) State the concept of receptors.

2.
 - a) What is meant by pharmacokinetics? Explain the steps involved in it.
 - b) Write an account on SAR studies of vasodilators.
 - c) Describe the relationship of chemical structure and biological activity of cardiac drugs.

(OR)

- c) Write briefly on history, nomenclature and literature of organic medicinal compounds.
(5+5+6=16)

3. a) Give the synthesis and mode of action of sulfadiazines.
b) Write the synthesis of diisopropylamine and discuss its mode of action.
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(OR)

- c) Write briefly on computer aided drug design. (5+5+6=16)

4. a) Give the synthesis and mode of action of nitrogen mustards.
b) Discuss the structural features and uses of norfloxacin and rifamycin.
c) Discuss the stereochemistry and biological activity of streptomycin.

(OR)

- c) Write the synthesis and mode of action of the followings :

i) Chlorobucil.

ii) Pyrimidines.

(5+5+6=16)

5. a) Give the structure and describe the biological activity of riboflavin and vitamin - A.
b) Write an account of transcription and translation.
c) Write briefly on genetic code base sequencing in nucleic acids.

(OR)

- c) Discuss the structure and biological activity of thiamine and vitamin B12. (5+5+6=16)
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PGIVS-013-B-21
M.Sc. IV Semester (CBCS) Degree Examination
CHEMISTRY
Inorganic Chemistry - IV
Paper : HCT - 4.1

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates:

- 1) All questions are compulsory.
- 2) All questions carry equal marks.

Answer any **eight** of the following:

(8×2=16)

1.
 - a) An electro thermal atomizer is more sensitive than flame atomizer? Explain.
 - b) Write the limitations of flame emission spectroscopy.
 - c) Write the principle of radiochromatography.
 - d) With the help of a thermogram, explain the decomposition of $\text{CaC}_2\text{O}_4 \cdot \text{H}_2\text{O}$ when heated at a rate of 6°C per minute.
 - e) How does furnace atmosphere affect the shape of TG Curves?
 - f) Give the basic principle of Mossbauer spectroscopy.
 - g) Explain the terms prolate and oblate nucleus.
 - h) Calculate the ESR frequency of an unpaired electron in a magnetic field of 30.00G(0.3T).
 - i) Define isomer shift. Explain its significance.
 - j) What is photoelectric effect?
2.
 - a) Describe the interferences encountered in flame photometry.
 - b) Write principle process of atomisation and excitation in plasma spectroscopy.
 - c) Draw a neat diagram of hollow cathode lamp and explain its principle of operation. Give the important applications of AAS.

(OR)

Write the comparison between

- i) AAS and ICP - AES.
- ii) ICP - AES with AES.

[5+5+6=16]

3. a) Describe in brief the components and their functions in the instrumentation of DTA.
- b) Give a brief account of radiometric titration's with suitable examples.
- c) Why is DSC technique better suited for the determination of heat of reaction than DTA? Discuss other applications of DSC.

(OR)

Discuss the principle and working of isotopic dilution technique? Mention its applications.

[5+5+6=16]

4. a) Discuss the application of Mossbauer spectroscopy in the structure elucidation of iron compounds and detection of oxidation states.
- b) Discuss the theory and applications of NQR spectroscopy.
- c) Explain the following with respect to Mossbauer spectroscopy.
- i) Quadrupole splitting
 - ii) Zeeman splitting.

(OR)

Calculate the energies of all quadrupole energy states for a nucleus with I value $3/2$ in an axillary symmetric field. Express the energies of NQR transitions as a function of eQq and predict the number of transitions.

[5+5+6=16]

5. a) Give an account of Auger electron spectroscopy.
- b) Write a note on kramer's degeneracy and koopman's theorem.
- c) Explain the principle of ESCA. Draw schematic diagram of photoelectron spectroscopy and label the components involves in it and explain its working.

(OR)

What is significance of g - value? Explain the factors affecting 'g' values of complexes.

[5+5+6=16]

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PGIVS-014-B-21
M.Sc. IV Semester (CBCS) Degree Examination
CHEMISTRY
Physical Chemistry - IV
Paper : HCT - 4.2

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates:

- 1) All questions are compulsory.
- 2) All questions carry equal marks.

Answer any **EIGHT** of the following:

(2×8=16)

1.
 - a) Write Butler-Volmer equation and explain the terms involved in it.
 - b) Define Bravais lattice and Reciprocal lattice
 - c) Differentiate between overtones, fundamental and hot bands.
 - d) Give the importance of Tafel equation.
 - e) Define bioluminescence.
 - f) Explain reciprocal lattice.
 - g) Differentiate between crystal system and crystal class.
 - h) Distinguish between Stokes and anti-Stokes lines in Raman spectra.
 - i) What is meant by macromolecular chain dimensions?
 - j) Write the structure of polypyrrole and give its application.
 2.
 - a) Explain the ion-solvent interaction employing Born model and write its significance. **(5)**
 - b) With the help of Jablonski diagram explain the various features of electron transitions. **(5)**
 - c) Give an account on the importance of electroplating with example. **(6)**
- (OR)**
- c) What is Stern-Volmer Equation, Give its significance.
3.
 - a) Give an account of various crystal systems observed in crystals, along with their figurative representations. **(5)**

b) Based on scattering angle and scattering intensity through electron diffraction technique, how does one differentiate between single/polycrystalline and amorphous compounds. (5)

c) Differentiate between neutron diffraction and X-ray differentiation in solids (6)

(OR)

c) Write a note on Bragg's equation.

4. a) Discuss P,Q R-branches in vibration-rotation spectra. (5)

b) Explain Frank-Condon Principle. (5)

c) Discuss vibrational Raman Spectra. (6)

(OR)

c) Discuss the vibrational-rotational spectrum of H₂O molecule.

5. a) Why do any polymers possess average molecular weight rather than absolute molecular weight? Discuss the end group analysis to determine the average molecular weight of a polymer. (5)

b) Give an account on the thermal behaviour of polymers in general. (5)

c) Give the significance of structural analysis conducting polymers. (6)

(OR)

c) Write a short note on Synthesis and applications of polyaniline.