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10514P14001  
DR. B. S

NOVEMBER/DECEMBER 2015

PCH31 — ORGANIC CHEMISTRY — III

Time: Three hours

Maximum : 75 marks

SECTION A — (5 × 6 = 30 marks)

Answer ALL questions.

1. (a) Define Bathochromic shift.  
Or  
(b) What is Isosbestic point?
2. (a) Draw the <sup>1</sup>H NMR spectra of acetaldehyde. (1)  
Or  
(b) Draw the <sup>13</sup>C with off resonance spectra of benzyl chloride.
3. (a) Draw McLafferty rearrangement.  
Or  
(b) State Octant rule.
4. (a) State isoprene rule.  
Or  
(b) Draw the structures of Campher and a-pinene.

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5. (a) Give the mechanism of Sandmeyer reaction.

Or

- (b) Give the mechanism of Pschorr reaction.

SECTION B — (3 × 15 = 45 marks)

Answer any THREE questions.

6. Explain the factors affecting various carbonyl stretching frequencies.
7. Differentiate CW from FT NMR. (2)
8. State and explain the following :  
(a) ORD  
(b) Cotton effect  
(c) Axial halo ketone rule.
9. Draw the total synthesis of Reserpine.
10. Write short notes on decomposition of diazo compounds and detection of free radicals by ESR.

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PG-TRB  
2005-08 BA English

SET

2) DR. B. S

NOVEMBER/DECEMBER 2011  
HCH33 — ORGANIC CHEMISTRY III (Elect)

Time : Three hours

Maximum : 75 marks

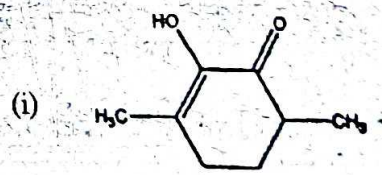
SECTION A — (5 × 6 = 30 marks)

Answer ALL questions.

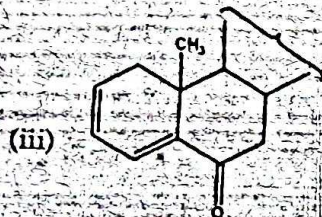
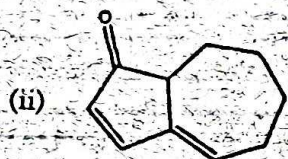
1. (a) What is meant by electronic spectroscopy? Define absorption range. Write the relationship between wavelength, frequency and wave number.

Or

(b) Calculate the  $\lambda_{max}$  in ethanol for the followings :



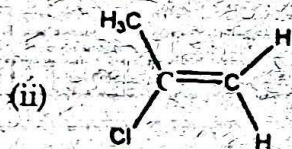
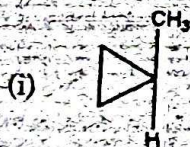




2. (a) Explain the relaxation process in NMR spectroscopy.

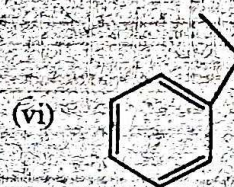
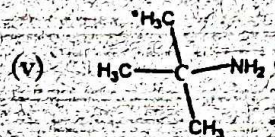
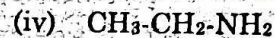
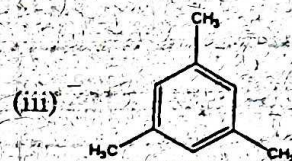
Or

(b) Write the number of  $^1\text{H}$  NMR signal for the followings.



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3. (a) Explain the term:

- (i) EI mode
- (ii) CI mode
- (iii) FD mode and
- (iv) FAB mode.

$\frac{108}{161}$   
CI

Or

(b) Explain the mass fragmentation pattern of benzyl radical ion ( $m/e = 108$ ).



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4. (a) The general formula of Penicillin is  $C_9H_{11}N_2O_4SR$ . Write the R group for the following kind of penicillin.

- (i) Penicillin I/F
- (ii) Penicillin II/G
- (iii) Penicillin III/X
- (iv) Penicillin IV/K
- (v) Dihydro-F-Penicillin and
- (vi) Penicillin V

Or

- (b) How penicillamine and Penilloaldehyde obtained from penicillin? Explain.

5. (a) What are long and short lived free radicals? Give examples. How to generate these radicals?

Or

- (b) Write the mechanism of Sandmeyer reaction with example.

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SECTION B — (3 × 15 = 45 marks)

Answer any THREE questions.

6. (a) Discuss the factors influencing the position and intensity of absorption bands.
- (b) Explain the instrumentation of IR spectroscopy with suitable diagram.
- (c) Explain briefly about intra and intermolecular hydrogen bonding in a molecule through IR spectroscopy. (5 + 5 + 5 = 15)

7. (a) What is meant by coupling constant 'J'? Explain the geminal and vicinal coupling in  $^1H$  NMR spectroscopy. (2)
- (b) Discuss the Anisotropic shielding of alkylene, alkynes, carbonyl and aromatic compounds in  $^1H$  NMR spectroscopy. (6 + 9 = 15)

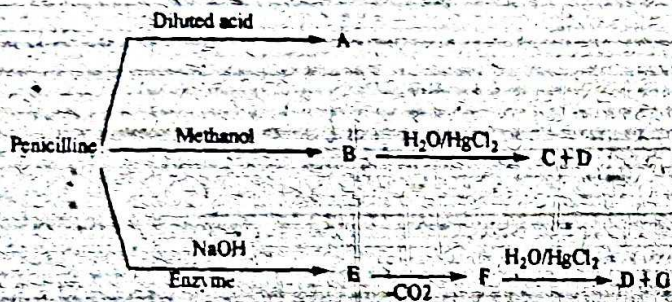
8. (a) Explain the instrumentation of Mass spectrometry with suitable diagram.
- (b) Briefly explain the retro-Diels-Alder reaction with suitable example. (8 + 7 = 15)

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9. (a) Predict the products of the following reactions:



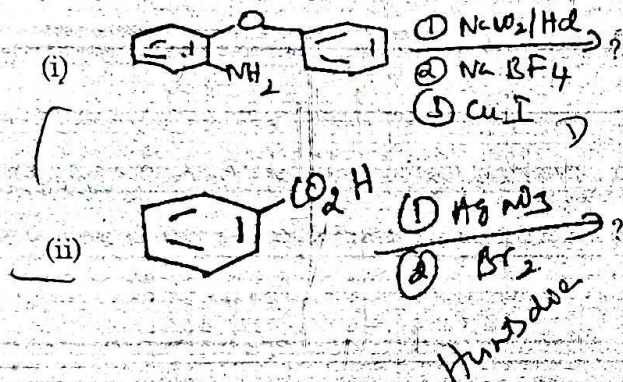
- (b) Write the synthesis of 6-aminopenicillanic acid. (7 + 8 = 15)
10. (a) Discuss the method of detection of free radicals by ESR.
- (b) Write and explain the mechanism of Ulmann reaction. (9 + 6 = 15)



9. Elucidate the structure of quinine. (15)

10. (a) Give three methods of generation free radicals. (5)

(b) Predict the product(s) and suggest suitable mechanism for the following.



Time : Three hours

Maximum : 75 marks

SECTION A — (5 × 6 = 30 marks)

Answer ALL questions.

1. (a) Explain the term chromophores and auxochromes with suitable examples.

Or

(b) What is meant by finger print region? How it is different from functional group region? Explain.

2. (a) Illustrate FT-NMR instrumentation (6)

Or

(b) Explain off-resonance decoupling with two examples. (5)



3. (a) State and explain Octant rule.

Or

(b) Explain the following technique in mass spectroscopy :

(i) EI

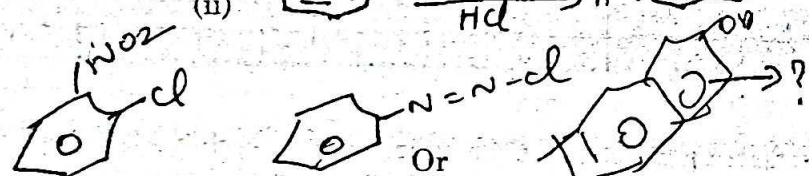
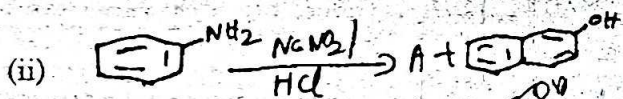
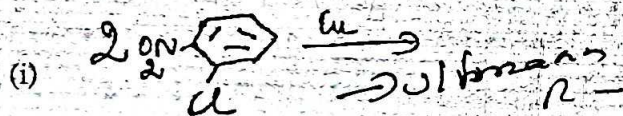
(ii) FAB

4. (a) Elucidate the structure of citral.

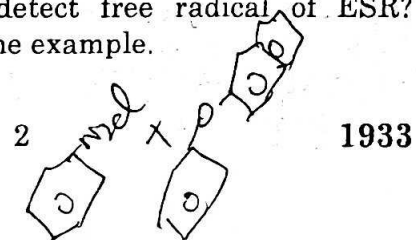
Or

(b) Write the synthesis of farnesol.

5. (a) Complete and explain the mechanism of the following reactions : (3+3=6)



(b) How do you detect free radical of ESR? Explain with one example.

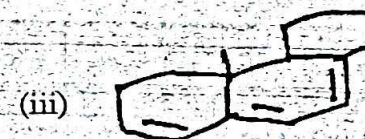


SECTION B — (3 × 15 = 45 marks)

Answer any THREE questions.

6. (a) How do you differentiate intra and molecular hydrogen bonding by spectroscopy? Explain.

(b) Calculate  $\lambda_{max}$  for the following



7. Discuss the factors which influencing chemical shifts in  $^1\text{H NMR}$ .

8. (a) Describe McLafferty rearrangement with examples.

(b) State and explain axial halo ketone rule. (5)

(c) An organic compound of molecular formula  $\text{C}_7\text{H}_6\text{O}$  exhibits the following fragmentation : (4)

$m/z$  : 106, 105, 77, 51

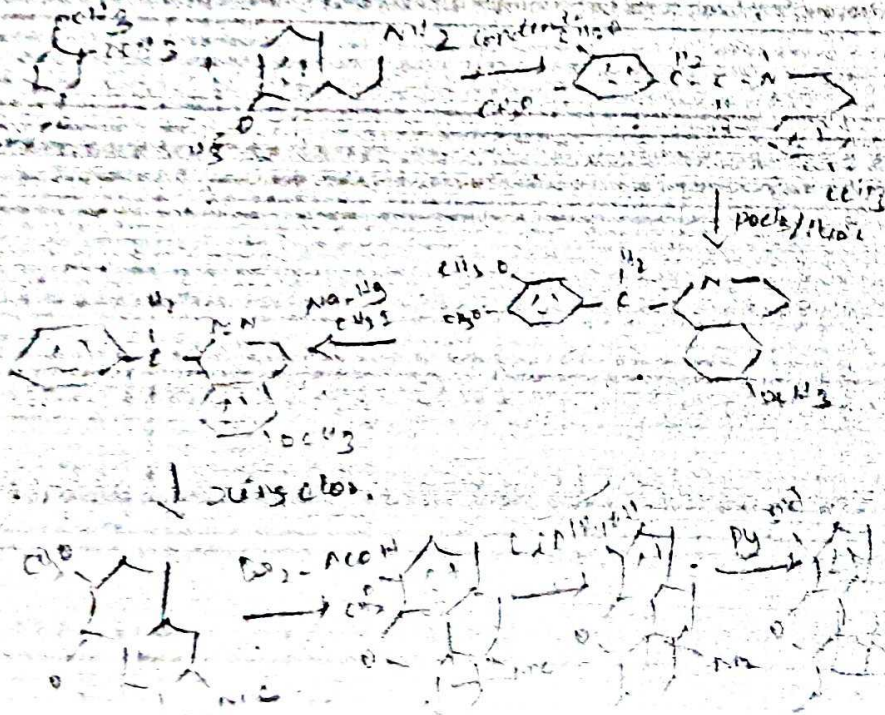


8. (a) Explain ORD and its applications. (10)  
 (b) Discuss the principles of mass spectrometry. (5)

9. Write the synthesis of morphine. (15)

10. (a) Discuss the generation, structure and stability of two long lived free radicals. (8)

(b) Explain the mechanism of Sandmeyer reactions. (7)



(4) DR. B.S

APRIL/MAY 2014

**PCH31 — ORGANIC CHEMISTRY — III**

Time : Three hours Maximum : 75 marks

SECTION A — (5 × 6 = 30 marks)

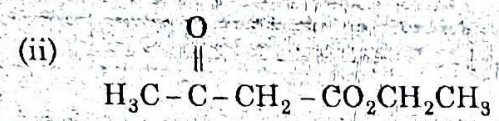
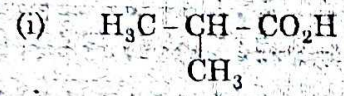
Answer ALL questions.

1. (a) Explain various type of transitions in UV visible spectroscopy. (6)

Or

(b) (i) What is meant by Far IR? Explain.  
 (ii) Write short note on metal ligand stretching. (3+3=6)

2. (a) How many  $^1\text{H}$ -NMR signals are observed for the following.



(iii)  $\text{CH}_3-\text{CH}_2-\text{CH}_2-\text{Cl}$  Explain.

Or

(b) Explain AB and AX spin system with suitable examples (6)



8. (a) Explain McLafferty rearrangement taking the example of  $\text{CH}_3\text{CD}_2\text{CN}_2\text{CH}_2\text{COCH}_3$ . (8)
- (b) How will you determine the conformation of (+) Cis-10-methyl-2-decalone by an application of cotton effect. (7)
9. Show that the following compounds could be synthesised from the indicated starting materials
- (a) Camphor from  $\alpha$ -pinene
- (b) Geraniol from citral
- (c)  $\alpha$ -Terpineol from geraniol.
10. Write notes on
- (a) Pschorr reaction
- (b) Ulmann reaction
- (c) Gomberg reaction
- (d) Detection of free radicals by ESR.

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DR.B.S 3)

NOVEMBER 2014

PCH31 — ORGANIC CHEMISTRY — III

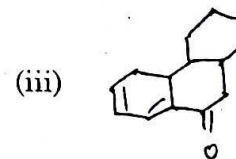
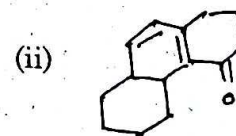
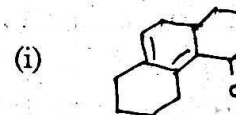
Time : Three hours

Maximum : 75 marks

SECTION A — (5 × 6 = 30 marks)

Answer ALL questions.

1. (a) Explain the importance of IR spectroscopy in finger print region
- Or
- (b) Using Woodward-Fieser rules, calculate the values of absorption maxima for the following compounds.









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APRIL/MAY 2017

**PCH31 — ORGANIC CHEMISTRY — III**

Time : Three hours      Maximum : 75 marks

**SECTION A — (5 × 6 = 30 marks)**

Answer ALL questions.

1. (a) What are various types of electron transactions?

Or

- (b) How do you identify benzoyl chloride from benzamide by IR Spectroscopy?

2. (a) Define chemical shift.

Or

- (b) What are geminal and vicinal coupling constants?

3. (a) Differentiate EI from CI mass spectrometry.

Or

- (b) What are Meta stable peaks?



4. (a) State isoprene rule and special isoprene rule.

Or

- (b) Draw the structures of Morphine and Reserpine and explain their applications.

5. (a) What are long and short lived free radicals?

Or

- (b) Write the mechanism of Hunsdiecker reaction.

SECTION B — (3 × 15 = 45 marks)

Answer any THREE questions.

6. (a) What are chromophores and auxochromes? (6)
- (b) Explain Woodward-Fisher rules for predicting  $\lambda_{\text{max}}$  of  $\alpha, \beta$ -unsaturated carbonyl compounds. (9)
7. Explain the factors affecting  $^1\text{H}$  NMR chemical shifts. (15)
8. Explain the following : (5 × 3 = 15)
- (a) Nitrogen rule
- (b) Base peak

- (c) Isotopic peak
- (d) Molecular ion peak
- (e) Meta stable ions.

9. (a) Apply isoprene rule for geraniol and camphor. (5)
- (b) Draw the total synthesis of Quinine (10)

10. How free radicals are generated and deducted? (15)



9. (a) State and illustrate isoprene rule. (5)  
 (b) Briefly discuss the structure of  $\alpha$ -pinene. (10)
10. Discuss the following (5 + 5 + 5)  
 (a) Formation of long and short lived free radicals  
 (b) Hunsdicker reaction  
 (c) Addition of free radicals to olefin double bonds.

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NOVEMBER/DECEMBER 2016

PCH31 — ORGANIC CHEMISTRY — III

Time : Three hours

Maximum : 75 marks

SECTION A — (5 × 6 = 30 marks)

Answer ALL questions.

1. (a) Discuss the factors influencing position and intensity of absorption bands.

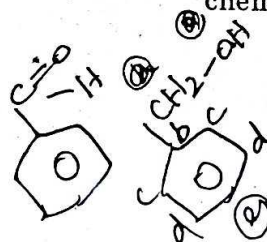
Or

- (b) Describe the application of IR spectrum.

2. (a) (i) Deduce the structure of compound ( $C_7H_8O$ ) which gave the following signals in its off resonance decoupled spectrum  $^{13}C$  NMR.

S scale : 64.5(t), 126.8 (d), 127.2(d), 128.2 (d) and 140.8 (s).

- (ii) Compare  $^{13}C$  NMR with  $^1H$  NMR with respect to operator frequency and chemical shifts.



Or





- (b) Explain the factors which influence the proton chemical shifts.
3. (a) (i) What is odd electron rule? State its significance.
- (ii) Discuss the fragmentation pattern of phenols.

Or

- (b) Write on the principle of EI and CI. Mention its advantages and disadvantages.
4. (a) Discuss the structure of Linalool.
- Or
- (b) Explain the chemistry of reserpine.
5. (a) Explain why triphenyl methyl radical is more stable.

Or

- (b) Write in detail about the detection of free radicals by ESR.

SECTION B — (3 × 15 = 45 marks)

Answer any THREE questions.

6. Discuss the following (4 + 8 + 3)
- (a) Metal ligand stretching vibrations.
- (b) Factor affecting vibrational frequencies
- (c) Finger print region.
7. (a) Outline principle and procedures of decoupling techniques employed in  $^{13}\text{C-NMR}$ . (5)
- (b) Explain the applications of  $^{13}\text{C-NMR}$  for characterizing organic molecules. (10)
8. (a) Describe the fragment pattern in a mass spectrum. (5)
- (b) Write notes on : (10)
- (i) Octant rule
- (ii) Cotton effect
- (iii) Axial halo ketone rule
- (iv) ORD.



glycol glycerol

$^{13}\text{C-NMR } \delta$  (ppm): 200.4(s), 137.0(s), 132.8(d),  
128.5(d), 128.0(d), 40.4(t),  
17.7(t), 13.8 (q).

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NOVEMBER/DECEMBER 2017  
PCH31 — ORGANIC CHEMISTRY — III

Time : Three hours

Maximum : 75 marks

- 8. (a) Write on the principle of FAB-fast atom bombardment ionisation. Mention its advantage and disadvantages. (5)
- (b) State and account of (i) Octant rule, (ii) Cotton effect, (iii) Axial halo ketone rule (iv) ORD and its applications. (10)

SECTION A — (5 × 6 = 30 marks)

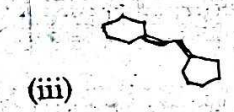
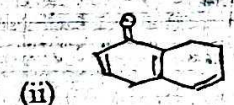
Answer ALL questions.

9. Discuss the total synthesis of reserpine.

10. Account on the following.

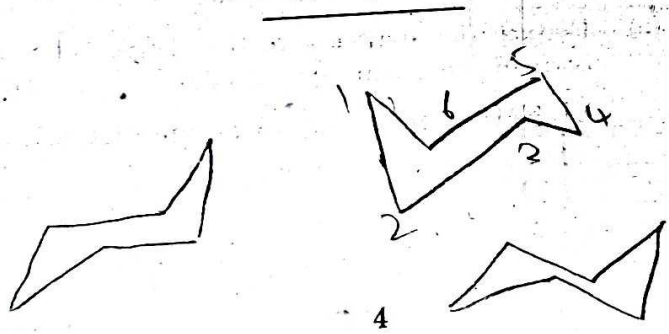
- (a) Sandmeyer reaction.
- (b) Hunsdiecker reaction.
- (c) Addition of free radicals to olefinic double bonds.

1. (a) Calculate the UV absorption maximum for the following compounds.



Or

(b) How is IR spectra helpful in the identification of inter and intra-molecular hydrogen bonding?





2. (a) Briefly explain the factors affecting  $^{13}\text{C}$  - chemical shifts.

Or

(b) Write a note on the working of a CW NMR instrument and recording on NMR spectrum.

3. (a) (i) What are meta stable ions? How are they formed? Mention its importance with an example. (4)

(ii) What is even electron rule? State its significance. (2)

Or

(b) Write a note on McLafferty rearrangement as observed in

(i) Alkyl ethers

(ii) Aliphatic esters.

4. (a) Elucidate the structure of geraniol.

Or

(b) Discuss the structural determination of farnesol.

5. (a) Explain the methods of generation of free radicals.

Or

2

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Acetaldehyde

(1)  $\text{C}=\text{O}$  1745  $\text{C}-\text{H}$   $\delta$ -vib  
(2)  $\text{H}-\text{C}-\text{O}$   $\delta$ -vib

(b) Write briefly on the following

(i) Gomberg reaction.

(ii) Ullmann reaction.

SECTION B — (3 × 15 = 45 marks)

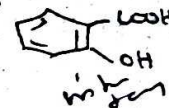
Answer any THREE questions.

6. (a) Discuss the factors influencing position and intensity of absorption bands. (5)

(b) How do you employ Woodward - Fieser rules to assign the configuration of  $\alpha, \beta$ -unsaturated carbonyl compounds? (5)

(c) Distinguish the following pairs by IR spectra (5)

(i) Acetaldehyde and acetone



7. (a) Give an account of magnetic anisotropic effect on chemical shift values. (5)

(b) Deduce the structure of the compound that corresponds to this spectral data. (10)

$^1\text{H-NMR}$   $\delta$  (ppm) : 7.5 - 8.2 (multiplet, 5H)

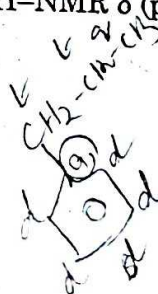
3.0 (Triplet, 2H)

1.8 (Sextet, 2H)

1.0 (Triplet, 3H)

3

acetamide



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Dr. S. D.

APRIL/MAY 2018

PCH31 — ORGANIC CHEMISTRY - III

Time : Three hours

Maximum : 75 marks

SECTION A — (5 × 6 = 30 marks)

Answer ALL questions.

1. (a) Briefly discuss about the factors influencing positions and intensity of absorption bands.

Or

- (b) Explain the factors affecting the vibrational frequencies.

2. (a) Write a note on factors affecting  $^{13}\text{C}$  chemical shift.

Or

- (b) Identify the following compounds using  $^1\text{H NMR}$  spectroscopy (i) 2-amino benzoic acid (ii) 4-hydroxy benzamide.



3. (a) Discuss the principles and measurement techniques in EI and FAB mass spectroscopy.

Or

- (b) Give a brief account of MC Lafferty rearrangement.

4. (a) Establish the structure of citral.

Or

- (b) Give the synthesis of Morphine.

5. (a) Explain the methods of generation of free radicals.

Or

- (b) Describe the mechanism of Hunsdicker reaction.

SECTION B — (3 × 15 = 45 marks)

Answer any THREE questions.

6. Discuss the following: (5+5+5)
- (a) Woodward fiser rule for dienes
- (b) Types of electronic transitions
- (c) Metal ligand vibrations.

7. (a) Explain the four isomers with molecular formula  $C_3H_6Cl_2$  using splitting pattern. (5)

- (b) Write notes on:

- (i) Nuclear overhauser effect
- (ii) CW and FT NMR experiments. (10)

8. Briefly discuss the fragmentation patterns of hydrocarbons, alcohols, aldehyde and ketones.

9. (a) Establish the structural determination of  $\alpha$ -pinene. (10)

- (b) Give the synthesis of reserpine. (5)

10. Explain the mechanism of the following reactions. (5+5+5)

- (a) Sandmeyer reaction
- (b) Pschorr reaction
- (c) Ulmann reaction.



C-17

Dr. B.S.

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## SECTION B — (3 × 15 = 45 marks)

Answer any THREE questions.

6. Discuss the following with suitable examples
- Factors influencing the position and intensity of absorption bands.
  - Differentiate the intra and inter molecular hydrogen bonding using IR Spectra.
7. Write short notes on:
- NOE
  - Factors influencing proton chemical shifts
  - Proton decoupled and off resonance spectra.
8. Explain the factors affecting cleavage patterns in mass spectrum.
- Describe the CRD and its application.
  - Give the fragmentation pattern of hydrocarbons.
9. Discuss the detailed structural determination of camphor and reserpine.
10. Write short note on:
- Methods of generation of free radicals.
  - Ulmann reaction.
  - Hunsdiecker reaction.

NOVEMBER/DECEMBER 2018

MCH31 — ORGANIC CHEMISTRY — III

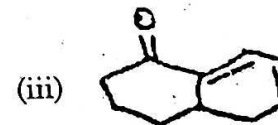
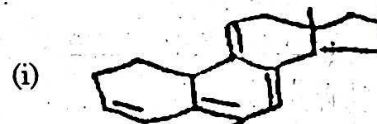
Time : Three hours

Maximum : 75 marks

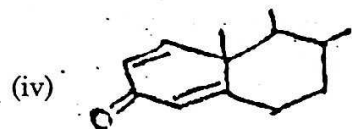
## SECTION A — (5 × 6 = 30 marks)

Answer ALL questions.

1. (a) Calculate the  $\lambda_{\max}$  for the following compounds using Woodward-Fieser rules.







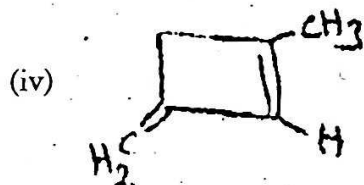
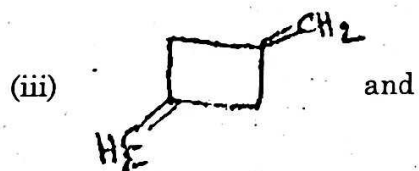
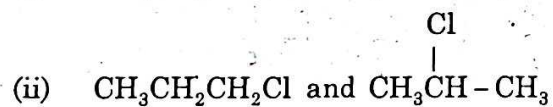
Or

- (b) Discuss the factors affecting vibrational frequencies in IR spectrum.

2. (a) Write a note on CW and FT NMR.

Or

- (b) How do you differentiate the following compounds using <sup>1</sup>H NMR Spectra?



3. (a) Explain the FAB, SIMS measurement techniques in the mass spectroscopy.

Or

- (b) Write note on the following:

- (i) Mc Lafferty rearrangement  
 (ii) Octant rule  
 (iii) Cotton effect.

4. (a) Describe the structural determination of citral.

Or

- (b) Discuss the synthesis of quinine.

5. (a) Write the method of detection of free radicals by ESR.

Or

- (b) Explain the following reactions with mechanism

- (i) Sandmeyer reaction  
 (ii) Pschorr reaction.



Dr. B.S

APRIL/MAY 2019

## PCH31 — ORGANIC CHEMISTRY — III

Time : Three hours

Maximum : 75 marks

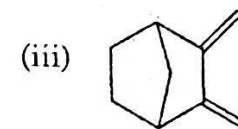
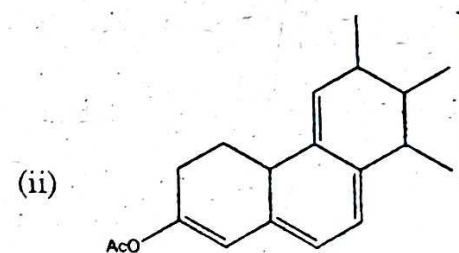
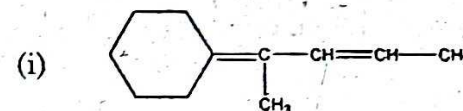
## SECTION A — (5 × 6 = 30 marks)

Answer ALL questions.

1. (a) Differentiate inter and intramolecular hydrogen bonding by IR spectroscopy

Or

- (b) Calculate the  $\lambda_{\text{max}}$  for the followings.



10. (a) Give generation, addition and substitution reaction of free radicals.
- (b) Explain the reaction mechanism of Gomberg reaction. (9+6)

2. (a) Briefly discuss about the principle of NMR spectroscopy.

Or

- (b) What is meant by peak, signals, integral value and coupling constants?

3. (a) Explain the principle of Mass spectrometry.

Or

- (b) Describe the Mass spectra of phenylacetic acid.

4. (a) Explain the classification of terpenes with example.

Or

- (b) Describe the total synthesis of quinine.

5. (a) Differentiate short- and long-lived free radicals with examples.

Or

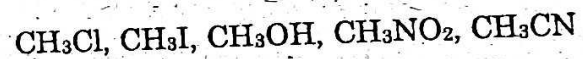
- (b) Briefly explain about the Sandmeyer reaction with example.

SECTION B — (3 × 15 = 45 marks)

Answer any THREE questions.

6. (a) What are the factors affecting the vibrational frequencies? Explain  
(b) Briefly discuss about the absorption spectra of dienes.  
(c) Write a note on fingerprint and far IR region. (5+5+5)

7. (a) What do you understand when you assign the  $^1\text{H}$  chemical shift of the followings?



- (b) Explain the factors affecting the  $^{13}\text{C}$  NMR spectra. (10+5)

8. (a) Write a note on: (i) Fragment ions odd and even electron type (ii) Octant rule (iii) McLafferty rearrangement.

- (b) Describe the mass spectral pattern of benzyl alcohol. (9+6)

9. (a) Narrate the method of structural elucidation of camphor

- (b) Describe the synthesis of reserpine. (10+5)