

M.Sc. (Final) Examination, 2020

CHEMISTRY

Paper - I (CH-501)

APPLICATIONS OF SPECTROSCOPY, PHOTOCHEMISTRY AND SOLID
STATE CHEMISTRY

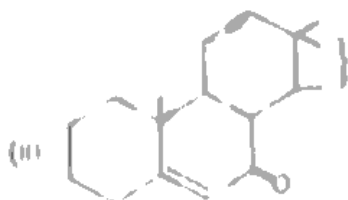
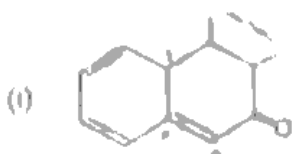
Time : 3 Hours

Maximum Marks : 100

- Note: (i) No supplementary answer-book will be given to any candidate. Hence the candidates should write the answer precisely in the main answer-book only.
- (ii) All the parts of one question should be answered at one place in the answer book. One complete question should not be answered at different places in the answer book.
- (iii) Attempt five questions in all, selecting at least one question from each Unit. All questions carry equal marks.

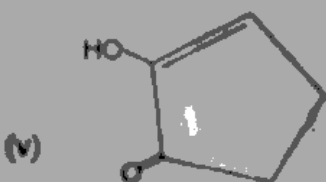
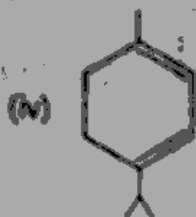
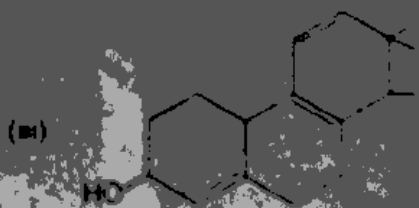
Unit-I

1. (a) On the basis of Woodward Fieser rules, calculate λ_{max} for the following compound



(1)

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- (b) Write short notes on :
- | | |
|-------------------------------|---|
| (i) Finger print region | 5 |
| (ii) Charge Transfer Spectra. | 5 |
2. (a) Explain the coupled interaction for amide and carboxylic acid. 10
- (b) Write short notes on:
- | | |
|-------------------------|---|
| (i) Overtone band | 5 |
| (ii) Fermi - Resonance. | 5 |

Unit-'II'

3. (a) Explain quadrupole splitting in $[Fe(CN)_6^{4-}]$ ion. 10
- (b) Write short notes on :
- | | |
|---|---|
| (i) Nuclear Zeeman splitting in Mossbauer spectroscopy. | 5 |
| (ii) Isomer shift and Cune point. | 5 |

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- 4 Explain the following :
- (a) ORD, CD and Cotton effect 10
 - (b) Octant rule. 10

Unit-'III'

5. Explain the following
- (a) INADEQUATE spectrum of 2-butanol. 10
 - (b) C^{13} -NMR spectrum of 3-methyl pentane and phenyl acetic acid. 10
6. (a) Write short notes on
- (i) Base peak and metastable ion peak 5
 - (ii) Mc Lafferty rearrangement. 5
- (b) Explain the following :
- (i) Mass spectrum of cyclopentanone 5
 - (ii) Mass spectrum of nitrobenzene. 5

Unit-'IV'

- 7 (a) Discuss the quantum yield and its affecting factors. 10
- (b) Write short notes on:
- (i) Norrish type - I and II reaction 5
 - (ii) Photoreduction reaction.

- 8 Explain the following
- (a) Rearrangement of 1, 4 diene and 1, 5 - diene.
 - (b) Photochemical substitution of aromatic compound.

Unit-'V'

- 9 (a) Explain Band theory of conductor, some examples.
- (b) Give brief account on superconductivity.

10 (a) Explain the kinetics of solid state reactions.

10

(b) Write short notes on

(i) Doping semiconductor

6

(ii) Colour centre

6