

Roll No.:

(2)

Total No. of Questions : 11] [Total No. of Printed Pages : 7

PK-414

**M.Sc. IV Semester Chemistry (Reg./ATKT)
Examination June 2018**

APPLICATION FOR SPECTROSCOPY

Paper - I

Time Allowed : Three Hours]

[Maximum Marks : 85

Note : All questions are compulsory. Attempt all questions of each section in continuation.

Section - A

Objective Type Questions

$$10 \times 1\frac{1}{2} = 15$$

Q.1. Choose the correct answer:

- i) The region extending from 200 to 380 nm is called :
- (a) Hear UV (b) Quartz UV
 (c) Visible (d) Both (a) and (b)

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- vi) Distance between the centres of the peaks of doublet is called
 - (a) Coupling constant
 - (b) Spin constant
 - (c) Spin-spin coupling
 - (d) None
- vii) HECTOR experiments correlate C¹³ nuclei with directly attached
 - (a) H¹
 - (b) H²
 - (c) C¹³
 - (d) C¹²
- viii) In proton decoupled CMR spectra o, m and p-xylanes exhibit signals respectively
 - (a) 3, 4, 5
 - (b) 4, 5, 3
 - (c) 5, 4, 3
 - (d) 3, 5, 4
- ix) Quadrupole mass analyser
 - (a) Functions as a mass filter
 - (b) Employs radiofrequency electric quadrupole field to obtain machine value
 - (c) Requires no magnet
 - (d) All are correct

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- x) Useful information can be obtained from any ion by inducing collisionally activated dissociation with a pressure of a collision gas. This forms the basis of
 - (a) FTMB
 - (b) Tandem mass spectroscopy
 - (c) FAB
 - (d) Chemical ionisation

Section - B

Short Answer Type Questions

$$5 \times 5 = 25$$

Q.2. Describe Fieser woodword rule.

OR

Describe Beer Lambert Law.

- Q.3. Distinguish between the following each pair using IR spectra. (any one):
- a) Acetone from acetylene
 - b) Aniline from N-Methyl aniline

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- Q.4. Discuss an overview of NMR of metal nuclide with emphasis on ^{195}Pt .

OR

Give the some applications of NMR in Biochemical systems.

- Q.5. Explain two dimension NMR spectroscopy (any one) technique.

- a) COSY
- b) HMBC

- Q.6. What are molecular ion peak?

OR

Explain Nitrogen Rule.

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Section - C

Long Answer Type Questions

$$5 \times 9 = 45$$

- Q.7. Explain ultraviolet spectra of aromatic compounds with suitable examples and static effect in biphenyls.

OR

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Describe the ultraviolet bonds for carbonyl and unsaturated carbonyl compounds.

- Q.8. Discuss the effect of hydrogen bonding and solvent effect on vibrational frequencies with examples.

OR

Discuss the characteristics, vibrational frequencies of aromatic compounds, phenols and amines.

- Q.9. Discuss the contact and pseudo contact shifts of NMR spectroscopy. <https://www.onlinebu.com>

OR

Define Nuclear relaxation. Explain factors affecting nuclear relaxation with examples.

- Q.10. Explain chemical shift and coupling constant in aromatic and hetero aromatic compounds in C^{13} NMR spectroscopy.

OR

Describe the principle and experimental technique of carbon-13 NMR spectroscopy.

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Contd...

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Q.11. Explain factors affecting fragmentation, ion analysis, ion abundance and one mass spectral fragmentation of organic compound.

OR

Elucidate the structure of simple molecules (any two) using UV-Visible, IR, NMR and Mass spectral techniques.



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