DII-003-030403 Seat No. _____

M. Sc. Pharma. Organic Chemistry (Sem. IV) (CBCS) Examination

May / June - 2015

POC - 403 : Modern Analytical Techniques

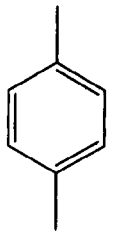
Faculty Code : 003
Subject Code : 030403

Time : $2\frac{1}{2}$ Hours] [Total Marks : **70**

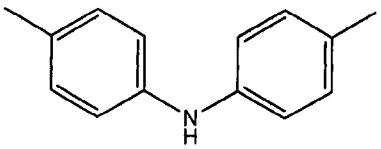
Instructions: 1. All questions are compulsory & carry equal marks.
2. Draw Diagrams &/ scheme of reaction wherever necessary.

Q.1 Answer any 7 of the following. **[14]**

1. What is Microtome?
2. Define optical rotation and optical activity.
3. Name the various types of excitation sources used in atomic emission spectroscopy.
4. What is combination band in IR Spectroscopy?
5. Explain Nitrogen rule with one example.
6. Why the homogeneous spin coupling is not often observable in CMR spectra?
7. Write Molecular ion peak values for (A) Aspirin, (B) Isatin
8. Distinguish between cis stillbin and trans stillbin by ^1H NMR
9. Explain ^1H NMR spectra for CH_3CH_2OH.
10. How many ^1H NMR signals dose each compound exhibit?



Compound 1



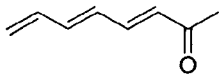
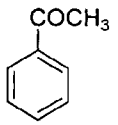
Compound 2

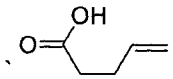
Q.2 Answer any 2 of the following. **[14]**

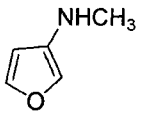
1. Discuss principle, instrumentation and application of atomic emission spectroscopy.
2. Discuss principle, instrumentation and application of Polarimeter.
3. Draw the constitutional isomers having molecular formula C_4H_9Br and indicate how many different kind of carbon atoms each has. Also draw the predicted CMR and PMR spectra for them.

Q.3 Answer the following. **[14]**

1. Write Stepwise protocol for liquid sample analysis in IR spectroscopy.
2. Distinguish following pairs of compounds by IR and MASS spectroscopy.

1  

2 



OR

Q.3 Answer the following. **[14]**

1. Explain instrumentation of Mass Spectrometry with schematic diagram
2. Draw the structure and give (a) probable m/z values, (b) expected IR values and (c) ^1H NMR signal for 4-Hydroxy Coumarin.

Q.4 Answer any 2 of the following. **[14]**

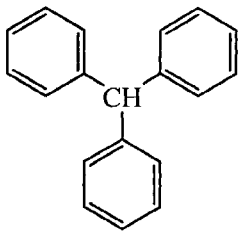
1. Explain various types of ionization technique used in Mass Spectrometry.
2. Explain all types of stretching and bending vibrations with schematic diagram.
3. Write a note on Photomultiplier tube with schematic diagram.

Q.5 Answer any 2 of the following. **[14]**

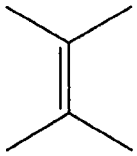
1. Discuss instrumentation of CMR Spectroscope.
2. Explain following rearrangement pattern involved in Mass Spectrometry. (a) Retro Diels-Alder rearrangement, (b) McLafferty rearrangement.

3. Explain factors affecting results of IR spectra. (Draw Diagrams &/ spectra wherever necessary.)

4. Predict, explain and draw the CMR and PMR spectra of following Structure



A



B
