B. Pharm/Sem-VII CBSGS/PA-III

18-11-15

QP Code : 21799

(3 HOURS) (TOTAL MARKS-70)

N.B:

1. All questions are compulsory.
2. Answer all sub questions together.
3. Draw neat labelled diagrams where necessary.
4. Figures to the right indicate full marks.

Q.1.a. Do as directed (any seven): (7)

i. Name any two visualisation techniques used in TLC.

ii. Name any two solvents used in NMR spectroscopy.

iii. Give m/z molecular ion peak for chlorobenzene.

iv. Name any two ionisation techniques used in mass spectrometry.

v. Name a stationary phase used in reverse phase HPLC.

vi. Give an example of a spraying reagent used in Paper chromatography.

vii. Give an example of a bulk property detector used in HPLC.

viii. Name an internal standard used in NMR spectroscopy.

b. Explain the term (any four): (8)

i. Tailing factor in HPLC.

ii Two dimensional TLC.

iii. FT-NMR.

iv. Base peak in Mass spectrum.

v. Coupling constant.

Q.2.a Answer the following (any two): (8)

i. Explain the Rheodyne sample injection system in HPLC.

ii. Explain the principle for Ion exchange chromatography. Give any 2 applications of this technique.

iii. Discuss any 1 interface used in LC-MS.

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b. Compounds X and Y were separated on a 15 cm HPLC column. The retention times of X and Y were 7.52 min and 10.14 min respectively. The peak widths at the base for X and Y were 0.51 min and 0.94 min respectively. (3)

Calculate: i. Number of theoretical plates for X.
ii. Resolution between X and Y.

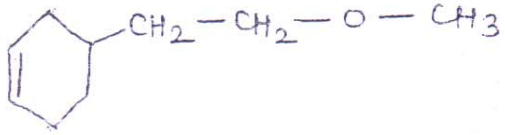
Q.3.a Answer the following (any two): (8)

i. Distinguish the following compounds by the use of a suitable spectroscopic technique. Justify your answer giving its spectral characteristics.

CH_3-CH_2-CH_2-O-CH_3 and CH_3-CH_2-CH_2-CH_2-O-CH_2-CH_3

ii. Explain spin-spin splitting in 1H-NMR spectroscopy.

iii. Depict any 2 fragmentation pathways for the following compound:



b. Give any 3 factors affecting resolution in TLC. (3)

Q.4.a. Answer the following (any two): (8)

i. Draw a block diagram showing various components of a mass spectrometer. Name any two analysers used.

ii. Discuss any 2 factors affecting chemical shift value in 1H-NMR spectroscopy.

iii. With reference to analytical method validation, explain the conduct of Precision studies.

b. Give a schematic classification of chromatographic methods. (3)

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Q.5.a. Answer the following (any two): (8)

i. Discuss the working of thermal conductivity detector.

ii. Predict the structure of the following compound whose spectral characteristics are as follows:

Molecular formula: $C_7H_{14}O_2$

I.R.(cm^{-1}): 2925, 1745, 1100

1H-NMR (δ-ppm)= 0.9 (t) (3H)
1.3 (d) (6H)
1.7 (sextet) (2H)
2.7 (septet) (1H)
4.1 (t) (2H)

Give appropriate justification for your answer.

iii. Predict the structure of the following compound whose spectral characteristics are as follows:

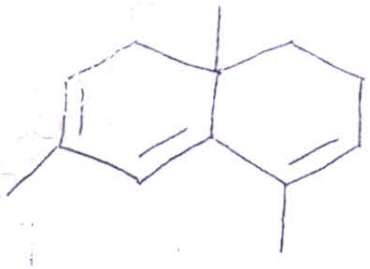
Molecular formula: $C_{10}H_9O_2N$

I.R.(cm^{-1}): 3050, 2200, 1720, 1100

1H-NMR (δ-ppm)= 7.8 (d) (20 squares)
7.5 (d) (21 squares)
4.1 (q) (22 squares)
1.0 (t) (31 squares)

Give appropriate justification for your answer.

b. Predict the λ max for the following compound showing UV absorbance: (3)



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Q.6.a. **Answer the following (any two):** (8)

i. Explain the working of any one type of pump used in HPLC instrument.

ii. Explain the various developmental techniques used in paper chromatography.

iii. Write a note on 'Simultaneous equation method' for multicomponent analysis by UV spectroscopy.

b. Predict the positions of absorption bands in the IR spectra of the following compound: (3)