

(A-104)

SARDAR PATEL UNIVERSITY

M.Sc. (Polymer Science & Technology) Semester-III Examination-2015

Tuesday, 21st April, 2015

2.30 p.m. to 5.30 p.m.

PS03EPST03: Sophisticated Instrumental Analysis

Total Marks: 70

- Note:** (1) Attempt all questions.
(2) Figures to the right indicate full marks.

Q.1 Write appropriate choice for the following. **(8)**

- (1) In a chromatography zone broadening due to magnitude of path is called _____
(a) eddy diffusion (b) broadening (c) asymmetry (d) None of these
- (2) _____ is the measure of column efficiency.
(a) plate (b) theoretical plate (c) flow rate (d) zone broadening
- (3) In mass spectra samples with lower vapour pressure are inserted directly into the _____
(a) ion separator (b) detector zone (c) ionization chamber (d) vaporization chamber
- (4) ^1H has _____ precessional orbit.
(a) 1 (b) 2 (c) 1/2 (d) 2
- (5) Nujol is used in _____ technique.
(a) KBr (b) semi-solid (c) thin film (d) mull
- (6) In a magnetic analyzer ions are separated on the basis of _____ values.
(a) negative (b) positive (c) m/z (d) molecular weight
- (7) _____ theory is the old theory of chromatography.
(a) rate (b) plate (c) partition (d) asymmetry
- (8) Molecular weight can be determined using _____ technique.
(a) Mass spectrometer (b) IR (c) NMR (d) all of these

Q.2 Attempt any **seven** of the following **(14)**

- (1) Define wave number.
- (2) Write the equation of Hook's law.
- (3) Draw a figure of rocking vibration and explain possible vibration direction.
- (4) Give the condition of NMR spectroscopy.
- (5) Give the classification of chromatography.

- (6) What is guard column?
- (7) Define peak asymmetry.
- (8) What are the basic requirements for IR-absorption?
- (9) What is molecular ion?

- Q.3** (a) Explain various modes of vibration in IR spectroscopy. (6)
- (b) Show cleavage of 1^o, 2^o, and 3^o, - alcohol with their possible peaks. (6)

OR

- (b) Draw a neat labeled diagram of IR spectrometer. (6)
- Q.4** (a) Explain with diagram component of single focusing mass spectrometer. (6)
- (b) Explain the theory of elution chromatography. (6)

OR

- (b) Give an account on sampling technique for solid analysis for IR spectroscopy. (6)
- Q.5** (a) Explain the theory of elution chromatography. (6)
- (b) Draw neat labeled diagram of HPLC instrument. (6)

OR

- (b) Explain the source of zone broadening. (6)
- Q.6** (a) What is shielding & de-shielding in NMR? Explain the factor affecting them. (6)
- (b) Give an account on NMR spectroscopy. (6)

OR

- (b) Answer the following. (6)
1. Explain spin-spin relaxation process.
 2. What is nuclear over house effect?
