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(A-30) **SARDAR PATEL UNIVERSITY**

M.Sc.Semester-III: Analytical Chemistry Examination (CBCS)

April-2016, Tuesday, Date: 12.04.2016

Time: 2.30 p.m. to 5.30 p.m., Paper: PS03ECHE05

Subject: Separation Methods

Total Marks: 70

*N.B.: i) The numbers of the marks carried by each question is indicated at the end of the question
ii) Assume suitable data if considered necessary and indicate the same clearly.*

- Q.1** Tick (✓) mark the right answer [08]
- i) Which of the following technique is an example of adsorption chromatography?

a) PC	b) TLC
c) GLC	d) IEC
 - ii) Give the name of separation technique use for separation of bio- molecules.

a) Ion exchange	b) Electrophoresis
c) Both b) & d)	d) SEC
 - iii) Which of the following GC detectors is used for halogenated pesticide?

a) RI	b) UV absorption
c) Modern FID	d) ECD
 - iv) What is the expected retention volume of a solute which has ($K_D=0.68$) when passed through a column that is 58 mL. of stationary phase and 6.3 mL. mobile phase?

a) 4.57 Lit.	b) 4.57 mL.
c) 45.75 mL.	d) 457 mL.
 - v) In ~~iso-electric~~ focusing the gel slab is prepared in which the _____ is changing from one end to other end.

a) pH	b) pore size
c) density	d) color
 - vi) Capacity of resin depends on _____.

a) porosity	b) rigidity
c) nature functional group	d) number of functional group
 - vii) TCD is a _____ sensitive detector.

a) Mass	b) Concentration
c) Charge	d) Hydrogen.
 - viii) Give the name of detector widely use in HPTLC.

a) RI	b) UV absorption
c) Fluorescence	d) Densitometer
- Q.2** a) Attempt any **SEVEN** [14]
- i) Discuss the classification of chromatography.
 - ii) Why post trailing of peak is observed in GSC? How is it avoided?
 - iii) Explain advantages of solvent extraction.
 - iv) Explain the function of guard column in HPLC.
 - v) Discuss swelling in IEC.

- vi) Why HPLC is superior over GC?
- vii) Explain the criteria of inert solid support use in GLC.
- viii) Differentiate normal phase and reversed phase chromatography.
- ix) Give the introductory note on SEC.
- Q.3** a) Discuss the column efficiency with the background of 'rate and plate' theory. [06]
- b) Discuss various types of PC techniques and its applications. [06]
- [OR]**
- b) Discuss the basic chromatographic equation and relative retention time. [06]
- Q.4** a) Describe instrumentation of SFC and SFE. [06]
- b) Explain the principle of solvent extraction. [06]
- [OR]**
- b) Discuss factor responsible for solvent extraction and applications. [06]
- Q.5** a) Discuss the 'resolution of peak". Two solutes with distribution ration 1.47 and 1.86 are to be separated on a column for which V_S/V_M is 13.6. How many theoretical plates are needed to ensure a resolution of 1.357? What length of column is required if $H = 0.25\text{cm}$? [06]
- b) Give the schematic of HPLC and discuss RI detector. [06]
- [OR]**
- b) Explain the need of "temperature programming" and "gradient elution" in GC and HPLC techniques respectively. How is it done? [06]
- Q.6** a) Explain the principle of electrophoresis. Discuss gel electrophoresis and gradient gel electrophoresis. [06]
- b) Explain the principle and selectivity of ion exchange chromatography. Discuss various types of ion exchanger. [06]
- [OR]**
- b) Discuss the principle of SEC and application. [06]

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