[176] SEAT No._____

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[176] SARDAR PATEL UNIVERSITY

M.Sc. (Chemistry) Third Semester (NC) Examination

Wednesday, Date: 27-03-2019

Time: 02.00 p.m. to 05.00 p.m.

Subject: Separation Methods Paper: PS03EANC21

N.B. (1) Figures to the right indicate full marks.
(2) Attempt all questions. [Total Marks: 70]

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1 **Select the correct answer from each of the following:** **(08)**

1. Detection of spot of amino acid components, _____reagent is generally used as spraying reagent.
   (a) thymol blue (b) bromo phenol blue (c) seliwanoff's (d) ninhydrin

2. The equation for distribution coefficient is not applicable for _____solution.
   (a) concentrated (b) dilute (c) normal (d) none of all

3. Which of the following separation technique use for bio-molecules?
   (a) Ion Exchange (b) GC-MS (c) Electrophoresis (d) GC

4. Which one of the following work as mobile phase in SFC
   (a) $CdCl_3$ (b) CO_2 (c) CO (d) SO_2

5. For capillary zone electrophoresis (CZE), _____is employed.
   (a) alternative current (b) reduced current
   (c) direct current (d) diffusion current

6. Fused silica column which have a thin layer of a stationary phase coated directly on the inner wall is called_____ column.
   (a) PLOT (b) WWOT (c) IFSOT (d) WCOT

7. In gel permeation chromatography, the granulated material or bedded gel is known as _____ materials.
   (a) Adsorbent (b) solid support (c) packing (d) none of all

8. Base line drift and base line noise both will limits the _____ of the detector
   (a) linearity (b) selectivity (c) sensitivity (d) efficiency

2 Answer the following: **(Any Seven)** **(14)**

[i] What are the important characteristic of an extractant?

[ii] Enlist the factors which are affect on R_F Value.

[iii] Discuss the Plate theory.

[iv] Difine the terms: 'electro dialysis' and distribution ratio.

[v] Explain briefly the importance of SFC.

[vi] Differentiate: Normal phase and Reverse phase chromatography.

[vii] What is the principle of paper chromatography?

[viii] Explain the importance feature of mobile phase in SFC.

[ix] Discuss in brief on the Plate theory.

(P.T.O)

3 **[a]** Answer the following: **(6)**

[i] Derive the relation for the extraction of solute from aqueous phase to organic phase.

[ii] Write a note on : Adsorbents used in TLC

OR

[a] Answer the following: **(6)**

[i] Discuss the methods used to detection of spots in paper chromatography.

[ii] 100 ml of water containing 1.0 gm of iodine is shaken with 50 ml of CCl_4, the distribution co-efficient of iodine between CCl_4 and water is 85. Calculate the amount of I_2 remaining in aqueous phase after extraction using 50 ml CCl_4 and 4 extractions using 12.5 ml CCl_4. (MW. of I_2 = 256 gm.Mole^{-1}).

[b] Discuss the methods used for fabrication of the TLC plate. Explain its detection and application. **(6)**

4 **[a]** Answer the following: **(6)**

[i] Explain the FID and its characteristics.

[ii] Give the comparison between TCD and FID. Explain the therm-ionic detector.

[b] Give the instrumental diagram of GC and explain the function of flow meter and sample splitter. **(6)**

OR

[b] What type of information retrieve from Rate theory? How to find $H_{min.}$ and $u_{opt.}$ with the Van-Deemter equation? Discuss its consequence. **(6)**

5 **[a]** Draw schematic diagram of SFC instrument. Discuss important features of supercritical fluid and explain its advantages. **(6)**

[b] Why earlier invented LC was not popular? Discuss the HPLC pumps. **(6)**

OR

[b] Answer the following: **(6)**

[i] Explain the principle and working of UV detector used in HPLC.

[ii] Describe the merits and demerits of HPLC.

6 **[a]** Answer the following: **(6)**

[i] Write short note on Curtain electrophoresis

[ii] Explain the principle and mechanism of size exclusion chromatography.

[b] Answer the following: **(6)**

[i] Give an account on the instrumentation of GPC.

[ii] Discuss in brief on the capillary electrophoresis.

OR

[b] Explain various types of ion exchanger. Discuss in detail the applications of IEC. **(6)**