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ICH 451

Sl.No. : 0028

II Semester M.Sc. Degree Examination, May 2018

INDUSTRIAL CHEMISTRY

Analytical Chemistry

Time : 3 Hours

Max. Marks : 70

PART - A

Answer any five questions.

(5 × 2 = 10)

- Q1) a) What is Student's t-test?
b) Differentiate between distribution ratio (D) and partition coefficient (K_D).
c) What is post precipitation? How does it differ from co-precipitation?
d) What is titration curve? Write the titration curve of $ZnSO_4$ with EDTA in complexometric titration.
e) What is the significance of eddy diffusion?
f) Mention the importance of R_f value.
g) What is salting out technique in solvent extraction?
h) Differentiate between nephelometry and turbidimetry.

PART - B

Answer any five questions.

(5 × 12 = 60)

- Q2) a) What is error? Write briefly on statistical treatment of errors.
b) What is Q-test? Explain the rules involved in the rejection of analytical data.
c) A chemist analyses iron ore for FeO and obtain a value of 12.35% with the standard deviation 0.08. Calculate 95% confidence interval of the mean base on
i) 4 determinations and ($t=3.182$)
ii) 8 determinations ($t=2.365$)

[4+4+4]

- Q3)** a) Give an account of TLC and its applications.
b) Sketch the schematic diagram of high performance liquid chromatography and its advantages.
c) Explain the basic principle of paper chromatography? Differentiate between one, two dimensional and circular chromatographic techniques.
(4+4+4)
- Q4)** a) Explain theory and instrumentation of cyclic voltametry.
b) Explain basic differences and applications of nephelometry and turbidometry.
(6+6)
- Q5)** a) What is a radiationless process? Show it in the energy level diagram.
b) Discuss the factors affecting fluorescence and phosphorescence.
c) Explain the basic principle, theory and applications of potentiometry.
(4+5+3)
- Q6)** a) What is Van Deemter equation and describe its usefulness in chromatographic separations.
b) Discuss the basic principle of flame ionization detector (FID). What types of analyte does the FID respond to?
c) In a paper chromatography separation of silver, lead and mercury the solvent front was 18 cm while front due to respective metals were 16(Ag), 12(Pb) and 6(Hg) cm. What is the R_f value of these metals.
(3+4+5)
- Q7)** a) How does the capillary column configuration achieve its advantages over the packed column setup in gas chromatography?
b) Explain the criteria for the rejection of an observation in Q-test using the following data 0.1026, 0.1019, 0.1047, 0.1014 and 0.1022 N.
c) What are the factors affecting liquid-liquid extraction? Explain each factor with a suitable example.
(3+3+6)