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AG—154—2018

FACULTY OF SCIENCE

M.Sc. (Second Year) (Third Semester) EXAMINATION

OCTOBER/NOVEMBER, 2018

(CBCS Pattern)

ANALYTICAL CHEMISTRY

Paper XVII (CH-533/4)

(Chromatography in Chemical Analysis–I)

(Friday, 30-11-2018) **Time : 2.00 p.m. to 5.00 p.m.**

Time—Three Hours *Maximum Marks*—75

N.B. :— (*i*) Attempt *All* questions.

(*ii*) Use of calculator is allowed.

1. Attempt any *three* : 15

(*a*) Discuss the application of G.L.C.

(*b*) Define chromatography and explain its type.

(*c*) Explain the sample application T.L.C.

(*d*) Give the optimization technique in chromatography.

(*e*) In G.L.C. separation of X, Y, Z species are area of peak noted as 14.8, 26.5 and 48.2 mt. respectively. Calculate percentage composition.

2. Attempt any *three* : 15

(*a*) Define :

(*i*) Migration rate

(*ii*) Partion ratio.

P.T.O.

(*b*) Explain R_f value in detail.

(*c*) Give the application of paper chromatography.

(*d*) Explain the theory of band broadening in chromatography.

(*e*) In cation exchange resin of Cu^{2+} on a column of 1.6 × 20 cm filled with resin 0.81 gm/ml. Calculate elution constant.

3. (*a*) Development of chromatogram. Explain. 8

Or

Explain principle of column chromatography.

(*b*) Explain Ion exchange equilibrium. 7

Or

If peak width of compound x it is $t_R^x = 4.3$ mt and compound y with $t_R^x = 5.1$ mt on chromatographic column with length 90 cm and height of plate = 0.03, state whether separation is possible ?

4. (*a*) Explain working of G.L.C. 8

Or

Paper chromatographic separation of Pb^{2+}, Ag^{2+}, Hg^{2+}, the solvent front was 20 cm while front due to respective metal ion was 17, 15 and 10 cm respectively. Calculate the R_f value of these metal ions.

(*b*) What are the application of column chromatography ? 7

Or

What are number of theoretical plate ? If N = 4200, x = 15.05, y = 14.82.

5. (A) Multiple Choice Questions : 5

(*i*) Chromatography was first invented by :

(*a*) M. Martin

(*b*) T. Sweet

(*c*) S. Martin

(*d*) None of the above

(*ii*) The surface used in T.L.C. is :

(*a*) Silica gel

(*b*) Zinc blend

(*c*) Both (*a*) and (*b*)

(*d*) None of the above

(*iii*) The separation of solute in paper chromatography depends on :

(*a*) Dissolution

(*b*) Partition

(*c*) Solution

(*d*) None of the above

(*iv*) This part of G.C. is called heart of it :

(*a*) Detector

(*b*) Recorder

(*c*) Sample injection

(*d*) None of the above

P.T.O.

(*v*) When movement of mobile phase is in upward direction, then the development is called :

(*a*) Radial

(*b*) Ascending

(*c*) Descending

(*d*) None of the above

(B) Write short notes on any *two* of the following : 10

(*i*) Separation of amino acid by paper chromatography

(*ii*) Location of spot on T.L.C.

(*iii*) Stationary phase and mobile phase.