

B. Sc. Semester III (Honours) Examination, 2018-19**CHEMISTRY****Course ID : 31415****Course Code : SHCHE/305SEC-1(T)**

Course Title: Basic Analytical Chemistry

Time: 2 Hours**Full Marks: 40***The figures in the margin indicate full marks.**Candidates are required to give their answers in their own words as far as practicable.*

1. Answer *any five* questions: 2×5=10
- Which one of 1.005g and 1.050g is more accurate and Why?
 - Mention major components of soil.
 - Distinguish between eluent and effluent.
 - Name the functional groups associated with cation and anion exchangers.
 - Define ion-exchange capacity. Write its unit.
 - Name and specify two adulterants used in food.
 - Write the structure of Ni-DMG complex, where DMG = Dimethylglyoxime.
 - What do you mean by R_f in relation to Thin Layer Chromatography (TLC)?
2. Answer *any four* questions: 5×4=20
- (i) Mention two important characteristics of metal-ion indicator.
(ii) Which of the following separation(s) is under the category of cation exchange chromatography?
 - Cis-trans isomeric complexes of Cobalt (II)
 - Cations of alkali and alkaline earth metal ions
 - NaCl and Na_2HPO_4
 - None of the above.

Explain in favour of your answer. 2+(1+2)=5
 - Briefly discuss the procedure for determination of iron in vitamin tablet by spectrophotometric method. 5
 - (i) Mention three important characteristics of a good ion-exchanger.
(ii) Write two important application of thin layer chromatography. 3+2=5

- (d) Describe the method for determination of Ca and Mg individually in a soil sample using complexometric titration. 5
- (e) (i) A 0.175 g sample of sodium chloride was passed over a cation exchange resin, previously converted into H⁺ -form and the resin was eluted with deionised water. Liberated acid was titrated with 0.107 (N) NaOH. What will be the titre value?
- (ii) Distinguish between precision and accuracy. 3+2=5
- (f) (i) What is the role of HCl in ether extraction of Fe(III) from aqueous solution?
- (ii) Discuss the mechanism of separation of Ni²⁺ and Co²⁺ from a mixture using ion-exchange resin. 2+3=5
- 3.** Answer *any one* questions: 10×1=10
- (a) (i) Write the major and minor constituents of cosmetics mentioning their function.
- (ii) Perform the operations with correct significant figure: $(0.69 \times 1.0042) + 2.30125$
- (iii) What are random errors? (2+2+2)+2+2=10
- (b) (i) What adulterants are used in turmeric powder, corriander powder, chilli powder, coffee powder and pulses?
- (ii) Why preservatives are used in food? Give an example.
- (iii) Discuss the basic principle of ion exchange chromatography.
- (iv) 22.22 g of cation exchanger in the H⁺ form can absorb Ca²⁺ ions fully from 1.0L of 0.1(N) CaCl₂ solution. Calculate the exchange capacity of the cation exchanger. 3+2+2+3=10
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