

Code No: A109210803

R09**Set No. 2**

II B.Tech I Semester Examinations, MAY 2011

ANALYTICAL CHEMISTRY

Chemical Engineering

Time: 3 hours

Max Marks: 75

Answer any FIVE Questions
All Questions carry equal marks

1. Write short note on:
 - (a) Columns in HPLC
 - (b) Quantitative analysis in HPLC
 - (c) Detectors in HPLC. [15]
2. With a neat diagram, explain the various components of an IR instrument and explain their unique functions. [15]
3. (a) What is a cupferron? How it is used for the estimation of Iron(III)? What are the favourable factors for effective precipitation?
(b) Distinguish between Cupferron and Neo-Cupferron. [10+5]
4. Write short notes on:
 - (a) Chelation
 - (b) Conditional formation constant
 - (c) Buffer solutions. [5+5+5]
5. Write the principle of gas chromatography and illustrate advantages of gas chromatography. [15]
6. (a) Write about the use of TLC to monitor progress of chemical reactions.
(b) How thin layer plates are prepared and write the procedure for application of sample? [8+7]
7. (a) What is meant by chromophones and auxochromes in the absorption spectra?
(b) The percentage transmittance of an aqueous sodium of disodium fumarate at 25°C and 250 nm is 19.2% for a 5×10^{-4} M solution in a 1 cm cell. Calculate the absorbance and molar absorption coefficient. [8+7]
8. (a) What are the possible combinations of ions causing alkalinity in water?
(b) What is BOD and COD? Explain their importance. [8+7]

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Set No. 4

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ANALYTICAL CHEMISTRY

Chemical Engineering

Time: 3 hours

Max Marks: 75

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Explain why hard water forms scales and sludges. What are the salts responsible causing hardness of water.
(b) Write a note on estimation of chlorides in water samples. [7+8]
2. (a) Write various types of columns in GC.
(b) Give a short note on detectors used in GC. [8+7]
3. (a) Explain a method for the spectrometric estimation of Iron in steel
(b) Calculate absorbance of 3.4×10^{-4} M colored thiocyanate complex of iron which had molar absorptivity of 3.2×10^{-3} at 580 nm taking path length as unity. [8+7]
4. (a) Write a note on Fermi resonance.
(b) How do you differentiate between aliphatic aldehydes from an aliphatic ketone by IR spectroscopy. [8+7]
5. (a) What are the merits and demerits of gravimetric analysis?
(b) Differentiate and distinguish between Gravimetric and Volumetric Analysis. [8+7]
6. (a) How is TLC useful for the separation of mixtures of compounds in small scale.
(b) Write a short note on Rf value & its significance. [8+7]
7. Give an account on the instrumentation of high performance liquid chromatography. [15]
8. (a) What are metal ion indicators? Explain with suitable example. How they are useful in the complexometric titrations?
(b) Describe the theory of metal ion indicators? [8+7]

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R09**Set No. 1**

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ANALYTICAL CHEMISTRY

Chemical Engineering

Time: 3 hours

Max Marks: 75

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Write a note on the detectors used in GC.
(b) Explain the terms retention time and retention volume. [8+7]
2. (a) Explain the principle and procedure for estimation of calcium by EDTA.
(b) Write a note on indicators used in red-ox titrations. [8+7]
3. (a) What do you understand by a "bond oscillator"? Explain the different types of bond oscillations in simple triatomic molecules.
(b) Differentiate between UV and IR spectra. [8+7]
4. (a) Give an account on the columns used and their packing materials in the HPLC.
(b) Write a note on quantitative analysis of HPLC. [10+5]
5. (a) What is hardness of water and explain the degree of hardness of water.
(b) Explain the principle and procedure involved in the estimation of chemical oxygen demand. [8+7]
6. (a) Differentiate between adsorption and absorption.
(b) Write a note on applications of column chromatography. [15]
7. (a) Mention the factors, which determine the success of quantitative analysis by gravimetry.
(b) Discuss how post-precipitation and co-precipitation affect the purity of precipitate in gravimetric analysis ? [5+10]
8. (a) Why is monochromatic light not easily attainable in spectrophotometer?
(b) Why is the opening of slits to obtain more power at the detector not a suitable alternative to the proper installation and alignment of the source lamp.
(c) 1.25 mg of a sample having mol.wt 120 was dissolved in methanol and its absorbance was recorded in UV radiation. Calculate value of extinction coefficient if the optical density of the solution is 0.16 and the path length is 1.2 cm. [4+4+7]

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R09**Set No. 3**

II B.Tech I Semester Examinations, MAY 2011

ANALYTICAL CHEMISTRY

Chemical Engineering

Time: 3 hours

Max Marks: 75

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Discuss paper chromatographic technique for the separation of amino acids.
(b) Write a note on R_f value and its significance, in chromatography? [10+5]
2. (a) What is Cupferron? Discuss its use as an organic precipitant with suitable examples?
(b) Write a short note on digestion of a precipitate and its significance? [8+7]
3. (a) Define ppm? What is degree of hardness of water?
(b) Why do we express hardness of water in terms of Calcium carbonate equivalent?
(c) Why does hard water consumes a lot of soap. [5+5+5]
4. (a) What is meant by pellet sampling technique in IR Spectroscopy. Explain its advantages and disadvantages.
(b) Write about Mull and Press Pellet sampling techniques. [8+7]
5. Write short note on:
 - (a) R_f value
 - (b) R_m value
 - (c) Capacity factor
 - (d) Retention volume. [15]
6. (a) Describe the principle involved in complexometric titrations.
(b) How does one estimate copper by EDTA method? [15]
7. (a) What is meant by bathochromic effect or a red shift? What is its significance in the UV spectroscopy?
(b) What are the different types of solvents used in UV spectra? [8+7]
8. Discuss how the HPLC is useful for analysis of organic compounds. [15]
