

Code No: A109210803

R09**Set No. 2**

II B.Tech I Semester Examinations, November 2010

ANALYTICAL CHEMISTRY

Chemical Engineering

Time: 3 hours

Max Marks: 75

Answer any FIVE Questions
All Questions carry equal marks

- Explain in detail thin layer chromatographic technique for the separation of mixture available in small amounts.
 - Write a note on Retention time. [10+5]
- What is the main function of each of the following components of a spectrophotometer Radiation source, Monochromator, Analyser cum Detector. [15]
- Discuss the quantitative and qualitative applications of HPLC. [15]
- The water sample collected from College of engineering Kakinada and the following analysis is observed $\text{Ca}(\text{HCO}_3)_2 = 162\text{ppm}$, $\text{Mg}(\text{HCO}_3)_2 = 146\text{ppm}$, $\text{CaSO}_4 = 136$, $\text{MgSO}_4 = 12\text{ppm}$, $\text{MgCl}_2 = 9.5$. Calculate temporary, permanent and total hardness of the water sample. [15]
- What is the principle involved in the precipitation from homogeneous solution? What are its advantages?
 - Write short notes on applications of gravimetric analysis. [10+5]
- Explain with examples, how IR spectroscopy can be utilized to monitor the progress of reactions?
 - Why are 1 cm cells seldom used in liquid IR studies? [8+7]
- Discuss in detail about asymmetry factor and write the normalization methods.
 - Write a note on plate theory. [10+5]
- Differentiate and distinguish between primary standard substances and secondary standard substances in volumetric analysis.
 - 25 cm³ of Iron(II) sulphate solution react completely with 30 cm³ of 0.125N potassium permanganate. Calculate the strength of iron solution in grams of FeSO₄ per CC? [8+7]

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R09**Set No. 4**

II B.Tech I Semester Examinations, November 2010

ANALYTICAL CHEMISTRY

Chemical Engineering

Time: 3 hours

Max Marks: 75

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Explain the use of UV-visible spectroscopy in the estimation of manganese in steel sample.
(b) Calculate molar absorptivity if 1.25×10^{-5} M solution had an absorbance of 0.210 with an optical path length of 10 mm at 430 nm. [8+7]
2. (a) Discuss the disadvantage of single-beam infrared spectrophotometer.
(b) What are the different types of detectors used in IR spectroscopy. [8+7]
3. (a) Describe the principle and procedure for quantitative analysis of solder.
(b) Differentiate between Iodometry and Iodimetry with suitable examples. [8+7]
4. (a) Compare the GC and liquid chromatography with HPLC.
(b) Discuss the role of Guard column. [10+5]
5. What is hardness of water? Explain the experimental determination of hardness of Water by complexometric method. [15]
6. Write short note on:
 - (a) R_f value
 - (b) R_m value
 - (c) Capacity factor
 - (d) Retention volume. [15]
7. (a) Describe in detail the experimental procedure for carrying out TLC.
(b) In a TLC separation the R_f value of unknown compound was 0.803. The front due to compound A,B,C was 24,28,30 cms with solvent front as 34 cms. Identify the unknown compound. [8+7]
8. (a) Differentiate between a precipitate a colloidal solution and a simple solution?
(b) Explain how the surface area of the given mass increases with decrease in particle size? What is flocculation? [8+7]

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R09**Set No. 1**

II B.Tech I Semester Examinations, November 2010

ANALYTICAL CHEMISTRY

Chemical Engineering

Time: 3 hours

Max Marks: 75

Answer any FIVE Questions
All Questions carry equal marks

1. (a) What are the chemical reactions that take place in the determination of dissolved oxygen?
(b) What is BOD? Explain the determination of BOD in water sample. What is its significance? [8+7]
2. Write a short note on any two of the following:
(a) SCOT column
(b) Retardation factor
(c) Plate theory. [15]
3. (a) What is a Precipitate? How it is formed?
(b) What are the different conditions for effective Precipitation? [8+7]
4. (a) Explain the Job's method of continuous variation for molar composition of a complex?
(b) What is meant by Slope ratio method for a molar composition of a complex? Explain. [8+7]
5. (a) Explain the principle and procedure for the estimation of iron in an iron alloy.
(b) What is meant by neutralization curves? Explain with suitable examples. [8+7]
6. Discuss the principles of the following chromatographic methods:
(a) GC
(b) HPTLC
(c) Paper Chromatography
(d) HPLC. [15]
7. (a) Write briefly on factors that influence the position of absorptions in IR spectroscopy.
(b) Differentiate between the applications of IR and Raman spectroscopies. [8+7]
8. (a) Discuss briefly retention time and retardation factor value.
(b) In paper chromatographic separation of silver lead and mercury, solvent front was 20 cms while fronts due to these elements was respectively 18, 16 and 10. Calculate of R_f values of above metals. [8+7]

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R09

Set No. 1

FIRSTRANKER

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R09**Set No. 3**

II B.Tech I Semester Examinations, November 2010

ANALYTICAL CHEMISTRY

Chemical Engineering

Time: 3 hours

Max Marks: 75

Answer any FIVE Questions
All Questions carry equal marks

- Derive Beer Lambert's law. Give its application in quantitative analysis.
 - Evaluate the concentration of a solution if it had an absorbance of 0.555 with molar absorptivity of 2.22×10^4 and optical path 1.5 cm. [8+7]
- Discuss briefly internal indicators used in redox reactions.
 - Explain the analysis of brass solder by volumetric method. [8+7]
- Write the principle of HPLC and discuss the instrumentation of HPLC with a neat diagram. [15]
- Discuss the mobile phase used in GC.
 - Write short note on capacity factor, chromatogram and retardation factor. [5+10]
- Why do we wash the precipitate in gravimetric analysis? How it is useful in the gravimetric analysis?
 - What are the different kinds of wash solutions? Explain briefly. [5+10]
- How many fundamental vibration frequencies would you expect to observe in the infrared absorption spectrum of carbondioxide?
 - Which salts are used for optical systems in infrared spectroscopy? Give reasons. [8+7]
- Why TLC is superior over other chromatographic techniques for detection purposes.
 - Write short note on retardation factor value. [8+7]
- Why concentration of hardness as well as non hardness constituting ions are expressed in terms of equivalent amount of calcium carbonate. And give the formula for calculation of equivalent of calcium carbonate.
 - Calculate the following dissolved salts in terms of calcium carbonate equivalent $\text{Ca}(\text{HCO}_3)_2 = 16.2\text{ppm}$, $\text{Mg}(\text{HCO}_3)_2 = 14.6\text{ppm}$, $\text{CaSO}_4 = 13.6$, $\text{MgSO}_4 = 12\text{ppm}$ $\text{MgCl}_2 = 9.5$. [8+7]
