

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI-86  
(For candidates admitted during the academic year 2015–16& thereafter)

SUBJECT CODE: 15CH/MC/AC14

B.Sc. DEGREE EXAMINATION, NOVEMBER 2017  
BRANCH IV- CHEMISTRY  
FIRST SEMESTER

COURSE : MAJOR CORE

PAPER : ANALYTICAL CHEMISTRY

TIME : 3 HOURS

MAX.MARKS :100

Section- A  
Answer all questions

Choose the correct answer:

(30×1=30)

- Error occurring due to instrument is classified as  
(a) determinate (b) indeterminate (c) both (d) none
- The molarity of  $\text{H}_2\text{SO}_4$  solution having 4.9g in one litre is  
(a) 1M (b) 0.01M (c) 0.5 M (d) 0.05M
- In TLC plates the identification of colourless separated aminoacids is done by  
(a) phenolphthalein (b) methyl orange (c) Iodine (d) ninhydrin
- When analyzing compounds are vaporizable without decomposition, the best separation technique that can be used is  
(a) TLC (b) Gas chromatography (c) HPLC (d) electrophoresis
- According to VonWeiman ratio the particle size of the precipitate is  
(a) inversely proportional to relative super saturation  
(b) directly proportional to supersaturation  
(c) inversely proportional to actual concentration of solute  
(d) none
- The gravimetric factor of Cl in AgCl [ atomic mass of Ag-107.87 and Cl-35.5] is  
(a) 0.247 (b) 2.47 (c) 24.7 (d) 0.0247
- Silvernitrate decomposes at  $473^\circ\text{C}$  to  
(a) Ag,  $\text{NO}_2$ ,  $\text{O}_2$  (b)  $\text{Ag}_2\text{O}$ ,  $\text{NO}_2$  (c) Ag, NO,  $\text{O}_2$  (d) Ag, NO
- The heat of neutralization of a strong acid vs strong base is  
(a) +56 kJ/mol (b) -56 kJ/mol (c) +49.5kJ/mol (d) -49.5kJ/mol
- Dipole moment doesnot depend on  
(a) polarity (b) magnitude of charge (c) geometry of molecule (d) density
- The chemical composition of magnetic minerals can be identified by  
(a) magnetic permeability (b) magnetic susceptibility  
(c) dipole moment (d) temperature varied magnetic susceptibility

Fill in the blanks:

- The normality of NaOH solution having 20g in 500 ml is-----
- is the measure of relative variability.
- Retention factor in paper chromatography is -----
- The extraction technique that is used when a desired compound has limited solubility in solvent and impurities are insoluble in solvent is -----.
- The equivalent point in an acid base titration is always ----- than the endpoint of the titration.

16. The titration technique in which a substance can be analysed is called -----
17. The weight loss during dehydration and decomposition of a compound as a function of temperature is given by ----- technique.
18. Heat changes involved in redox reactions is followed by ----- analysis.
19. The unit of dipole moment is -----
20. The shape of molecule is symmetrical when dipole moment is -----

**Answer in one or two sentences:**

21. What is meant by standard deviation?
22. What is specific gravity of liquids?
23. Give one example for complexometric titration.
24. Give one difference between DTA and TGA
25. What is the basic reason for magnetic property of a material?
26. Which type of error occurs due to wrong calibration of weights?
27. Which extraction can be used when solvents with lower boiling point are to be removed?
28. What is the particle size of colloidal particles?
29. What is magnetic susceptibility?
30. What happens to antiferromagnets when temperature increases?

**Section B**

**Answer any five questions:**

**(5×6=30)**

31. (a)  $\text{AgNO}_3$  and  $\text{BaCl}_2$  reacts to give  $\text{AgCl}$  and  $\text{Ba}(\text{NO}_3)_2$ . If 410.8 g of barium nitrate is produced then how many grams of silver nitrate has reacted? (b) What is Q test? What is the importance of the test?
32. Explain the factors affecting solvent extraction.
33. Write short notes on paper chromatography.
34. (a) What are primary and secondary standards? Give examples. (b) Write any two applications of solubility product.
35. Give the principle involved in DSC and three applications of DSC.
36. How is dipole moment determined by temperature method?
37. (a) Give Curie-Weiss law and give its importance. (b) Write Clausius-Mosotti equation and its significance.

**Section C**

**Answer any two questions:**

**(2×20=40)**

38. (a) What is meant by accuracy and precision?  
 (b) Distinguish between mass and weight.  
 (c) Explain briefly principle, classification, choice of adsorbents in HPLC  
 (d) Give Nernst distribution law and its application in extraction. (4+3+7+6)
39. (a) What is nucleation?  
 (b) Give two limitations of volumetric analysis?  
 (c) What is coprecipitation and post precipitation? Give one example each  
 (d) Explain briefly the factors affecting TGA/DTA. (2+4+8+6)
40. (a) What is the principle involved in thermometric titration? Explain its instrumentation and give applications.  
 (b) How is magnetic susceptibility determined by Guoy's method? (10+10)

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