

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI-86
(For candidates admitted during the academic year 2008–09)

SUBJECT CODE: CH/MC/AC34
B.Sc. DEGREE EXAMINATION, NOVEMBER 2009
BRANCH IV- CHEMISTRY
THIRD SEMESTER

REG.NO

COURSE : MAJOR CORE

PAPER : ANALYTICAL CHEMISTRY

TIME : 30 MINUTES

MAX.MARKS : 30

SECTION – A

(30x1=30)

ANSWER ON THE QUESTION PAPER ITSELF:

I. Choose the correct answer :

(6 x 1 = 6 marks)

- The number of significant figures in 0.00149 is
(a) 3 (b) 6 (c) 5 (d) 2
- Iodine is purified by
(a) Sublimation (b) Steam distillation (c) Crystal growth (d) Dilution
- The stationary phase in column chromatography is
(a) Silica gel (b) Air (c) CO₂ (d) Aldehyde
- In GLC, the carrier gas used in
(a) He (b) O₂ (c) H₂O (d) CCl₄
- Colorimetric analysis can be used only for
(a) Organic Compounds (b) Inorganic Compounds
(c) Coloured Compounds (d) Complexes
- The dropping mercury cathode is referred to as electrode in polarography.
(a) Indicator (b) Standard (c) Macro (d) Anode

II. State whether True or False :

(6 x 1 = 6 marks)

- The difference between the measured value of a property and its accurate value is called error.
- Beer Lambert's law equation is $\log(I/I_0) = \epsilon Cl$
- The curve obtained by plotting dw/dt with T is called the DTG curve.
- One Debye is equal to 1×10^{-18} esu/cm.
- The dipole moment of HI is greater than HF.
- In the separation of amino acids, ninhydrin can be used as the detecting agent.

III. Match the following :**(6 x 1 = 6 marks)**

- | | |
|----------------------------------|-----------------|
| 13. Dipole moment | (a) ϵ |
| 14. Paramagnetic | (b) μ |
| 15. Spin quantum number | (c) χ_M |
| 16. Molar absorption coefficient | (d) O_2 |
| 17. Oxidising agent | (e) s |
| 18. Magnetic susceptibility | (f) Br_2/H_2O |

IV. Fill in the blanks :**(6 x 1 = 6 marks)**

19. Ilkovic equation is
20. In a thermobalance thermocouple is used to measure the sample temperature.
21. A mixture of benzene and toluene can be separated by distillation.
22. In DTA, temperature differences are plotted against
23. acts as a good adsorbent.
24. R_f value is defined as distance moved by the sample to

V. Answer in one or two lines:**(6 x 1 = 6 marks)**

25. Define precision.
26. Define chromatogram.
27. Mention any two criteria for purify a sample?
28. Name any two solvents used for extraction in the laboratory?
29. Define decomposition potential.
30. What are the types of diamagnetic ions?



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TIME : 2½ HOURS

MAX.MARKS : 70

SECTION – B

5X6=30

Answer any five questions.

1. Describe mean deviation and standard deviation. Explain how they are used in chemical analysis.
2. Explain the applications of Gas-Liquid Chromatographic technique.
3. Describe the principle of thermometric titration with an example.
4. Describe the extraction of solid organic substance using soxhlet extraction.
5. Sketch and explain TGA and DTA curves of calcium oxalate in air and CO₂ atmosphere.
6. Draw and explain the graphs to determine the end points of amperometric titrations.
7. State and explain the Curie-Weiss law.

SECTION – C

2X20=40

Answer any two questions.

8. (a) What are the types of errors encountered in analytical measurements? (6)
(b) A student obtained the following results for the percentage of manganese in a mineral 30.48, 30.71, 30.07, 30.62. Calculate the standard deviation. (4)
(c) Discuss the advantage and limitation of colorimetric analysis. (5)
(d) Explain the principle of solvent extraction. (5)
9. (a) Calculate the mean and median for 20.20, 20.08 and 20.01. (3)
(b) Discuss on Job's method of continuous variation. (7)
(c) Explain the terms (i) Concentration polarisation (ii) Migration current. (4)
(d) Explain the TGA of calcium oxalate monohydrate. (6)

10. (a) The dipole moment of a molecule A–B is 1.03D. The A-B distance is 1.27\AA . Calculate the percentage ionic character of this molecule. (3)
- (b) Explain the principle and procedure involved in the determination of dipole moment by the temperature method. (7)
- (c) Discuss the procedure for paper electrophoresis. (7)
- (d) What are scatter diagrams? Explain (3)
11. (a) Discuss the applications of magnetic moment. (6)
- (b) Explain the procedure and applications of Thermometric titration. (7)
- (c) Explain the experimental assembly of polarography. (7)

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