

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI-86  
(For candidates admitted during the academic year 2004 –05 & thereafter)

SUBJECT CODE: CH/MC/AC54  
B.Sc. DEGREE EXAMINATION, NOVEMBER 2009  
BRANCH IV- CHEMISTRY  
FIFTH 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:

Answer all the questions:

I Choose the correct answer from the following:

- The square of the standard deviation is known as
  - co-efficient of variance
  - absolute deviation
  - variance
  - relative standard deviation
- An index of purity of solid is its
  - boiling point
  - sublimation point
  - melting point
  - solubility in a solvent
- Spurious maxima of polarograms can be suppressed by the addition of
  - picric acid
  - $\beta$ - naphthol
  - methyl orange
  - gelatin
- In DTA analysis a dehydration step heads to a
  - broad endotherm
  - broad exotherm
  - narrow endotherm
  - narrow exotherm
- When there are  $n$ - protons adjacent to a given proton, the multiplicity of its NMR peak is given by
  - $2n+1$
  - $n+1$
  - $2n-1$
  - $n+2$
- Mass spectrometry is a
  - low pressure technique
  - high temperature technique
  - high pressure technique
  - low temperature technique

II State whether the following statements are true or false:

- The shift of absorption maxima to shorter wavelength is called bathochromic shift.
- The cells for IR spectrometry are usually made of sodium chloride.
- Homonuclear diatomic molecules are Raman active.
- According to Beer Lambert's law, the absorbance of a solution is directly proportional to the concentration of the solution.
- Substances with magnetic permeability less than one are called diamagnetic substances.
- In a diatomic molecule, the greater the electronegativity difference between the bonded atoms greater is its dipole moment.

**III Fill in the blanks with correct answer:**

13. The difference between the true value and the measured value with regard to the sign is the \_\_\_\_\_ error.
14. For identification purposes, in chromatography the spots are characterized by their \_\_\_\_\_ factor.
15. \_\_\_\_\_ involves the boiling of an impure liquid at atmospheric pressure and condensing the vapours to obtain the pure liquid.
16. The units for the diffusion coefficient of an ion are \_\_\_\_\_.
17. In a DTG curve, \_\_\_\_\_ is plotted against temperature.
18. In a DTG curve, an exotherm results when the temperature of the sample is \_\_\_\_\_ then that of the reference.

**IV Match the following:**

- |                        |   |   |
|------------------------|---|---|
| 19. Accuracy           | - | $(10 - \delta)$                               |
| 20. Precision          | - | Nernst distribution law                       |
| 21. Solvent extraction | - | Micro electrode                               |
| 22. DME                | - | Correctness of a measurement                  |
| 23. Hypsochromic shift | - | reproducibility of the results                |
| 24. Tan ( T )          | - | shift to longer frequency or lower wavelength |

**V Answer in one or two lines:**

25. What are systematic error?
26. What is meant by  $R_f$  value?
27. What is the normal boiling point of a liquid?
28. What are the advantages of DTA over TGA?
29. Write the Ilkovic equation and explain the terms.
30. Explain the term chromophore. Give an example.



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**TIME : 2½ HOURS**

**MAX.MARKS : 70**

**SECTION – B**

**5X6=30**

**Answer any five questions.**

1. Define the term standard deviation and confidence limits.
2. What are the principles of TLC? Give reasons for stating that it is considered better than PC.
3. What is meant by half-wave potential and what is its significance in polarography?
4. Name the factors that affect thermogravimetric curves and explain.
5. How does dipole moment vary in the series HF, HCl, HBr and HI ? Account for the variation.
6. Describe how the composition of Ni-EDTA complex is determined by colorimetric analysis.
7. What is meant by relaxation process? How does it operate?

**SECTION – C**

**2X20=40**

**Answer any two questions.**

8. Explain the terms
  - a) bathochromic shift
  - b) hypsochromic shift
  - c) hypochromic shift
  - d) hyperchromic shift
  - e) Chromophore
  - f) Auxochrome
  - g) Auxochrome
  - h) TMS
  - i) Molecular ion
  - j) Isotope peak
9. (i) Explain the following (3x5=15)
  - a) Residual current
  - b) Convection current
  - c) Migration current
  - d) Diffusion current
  - e) Limiting diffusion current(ii) Draw a diagram of current voltage curve showing all the parameters. (5)

10. a) What is the effect of Temperature on the magnetic property? (10)  
b) When is sublimation resorted to? How are substances having low vapour pressure purified? (10)
11. a) Calculate the standard deviation for the following data  
7.720, 7.725, 7.736, 7.719, 7.742 and 7.751 (10)  
b) Bring out the importance of significant figures and appropriate units in presenting scientific data. (10)

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