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 2007
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:

1. The active components from plant products are obtained by
   a) Soxhlet extraction b) Craig extraction
   c) chromatography d) all the three methods

2. The nuclei which are nmr active
   a) $_{6}C^{13}$ b) $_{5}B^{10}$ c) $_{1}H^{1}$ d) $_{7}N^{14}$

3. Ninhydrin is
   a) Indan – 1,2,3 – trione b) Indan – 1,2,3 – trione hydrate
   c) Indole d) none of the above

4. The number of significant figures of the following no. 7000.0 is
   a) 1 b) 2 c) 4 d) 5

5. The percentage transmittance for 0.0510 absorbance is
   a) 41.8% b) 32.7% c) 88.9% d) 54.6%

6. In the IR range, the molecule undergoes _____ transition
   a) nuclear b) rotational c) vibrational d) electronic

II Fill in the blanks with correct answer:

7. The desicant for ethanol molecule is _____.
8. Polarographic maxima is due to _____.
9. Hempel column is made up of _____
10. Neel temperature is _____.
11. The structure of EDTA is _____.
12. The best reagent to precipitate nickel is _____.

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III State whether the following statements are true or false:

13. NMR is taken at low temperature.
14. Ion-exchange phenomenon is non-stoichiometric.
15. High vaccum is maintained in mass spectrometer.
16. The lamp source in IR is tungsten lamp.
17. The instrument to measure transmittance is guoy balance.
18. Rotating mercury electrode is used in amperometric titrations.

IV Match the following:

19.	Elutotropic series	a) Detector in IR
20.	Gaussian distribution	b) λ_{max}
21.	Quartz crystal	c) bonded to silica
22.	Octadecyl group	d) m = f(T)
23.	Woodward Fieser rule	e) eluents in column chromatography
24.	DTG	f) Bell shaped curve

V Answer in one or two lines:

25. Define Beer – Lambert's Law.

26. What are Chromophores? Give examples.

27. Write the Ilkovic Equation**.**

28. The normality of a solution is determined by four separate titrations, the result being 0.2041, 0.2049, 0.2039 and 0.2043. Calculate the standard deviations.

29. How many normal vibration modes are possible in C_6H_6.

30. Define Curie-Weiss Law.

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TIME : 2 ½ HOURS **MAX.MARKS : 70**

SECTION – B **5X6=30**

Answer any five questions. All questions carry equal marks.

1. a) Write the Clausius – Mosotti equation.
   b) How is dipolemoment determined by temperature method? (2+4)

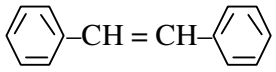
2. a) What is the principle of cyclic voltammetry?
   b) Mention any four applications of cyclic voltammetry. (2+4)

3. a) What are the factors that affect DTA estimation.
   b) Explain the thermal analysis of silver nitrate. (3+3)

4. a) Compare Raman and IR spectra.
   b) what are the advantages and limitations of colorimetric analysis. (2+4)

5. a) What is the superiority of TLC over other chromatographic techniques.
   b) What is meant by confidence limit? Explain. (4+2)

6. a) The results of an analysis found carbon to be 36.89%, as compared to the true value of 36.98%. What is the absolute error and relative error in parts per thousand?
   b) Which will have greater λ_{max} ? Justify?



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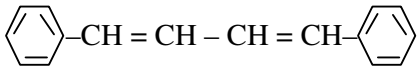

I II

(4+2)

7. Write short note on the following
   a) Migration current
   b) Sublimation
   c) Spin – spin coupling (3x2=6)

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SECTION – C 2X20=40

Answer any two questions. All questions carry equal marks.

8. a) What is the principle of steam distillation. Explain with suitable example. (2+8)

   b) Give a brief note on the following
   (i) HPLC
   (ii) Dropping mercury electrode
   (iii) Column chromatography (3+3+4)

9. a) Distinguish between the following
   (i) Stoke and anti Stoke lines
   (ii) Raman and Rayleigh scattering
   (iii) Bathochromic and Hypsochromic shifts.
   (iv) Magnetic susceptibility and magnetic moment.
   (v) Single beam and double beam spectrophotometers. (5x3=15)

   b) Draw the Dempster's mass spectrograph. (5)

10. a) How is Fe(III) estimated in water using thiocyanate. (10)

    b) Using Gouy balance, how will you determine the magnetic moment of a sample? (10)

11. Write a note on
    (i) Soxhlet extraction
    (ii) Electrophoresis
    (iii) Thermometric titrations
    (iv) amperometry (5x4=20)