LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION – **CHEMISTRY**

FIRST SEMESTER – NOVEMBER 2015

CH 1815 - ANALYTICAL CHEMISTRY

Date : 11/11/2015   Dept. No.   Max. : 100 Marks
Time : 01:00-04:00

Part-A

Answer ALL questions.   **(10 × 2 = 20)**

1. Two analysts gave the following observations. Which analyst is more precise and accurate?

    Analyst 1: (a) 49.01, (b) 49.21, (c) 49.08

    Analyst 2: (a) 49.40, (b) 49.42, (c) 49.44

2. A chemist analyses a sample of iron by 5 different methods and the results obtained are 0.218, 0.219, 0.230, 0.215 and 0.220 mg. Should the value 0.230 be discarded? (Table value = 0.64)

3. State the principle of electron capture detector.

4. Mention the salient points of Gaussian curve.

5. Mention the electrodes used in the amperometric detector of HPLC?

6. What are called Gran's Plots?

7. Sketch the cyclic voltammogram of $K_4[Fe(CN)_6]$.

8. Mention the advantages of turbidimetry.

9. What are sequestering agents? Give an example.

10. Calculate the molarity of pure water.

Part-B

Answer any EIGHT questions.   **(8 × 5 = 40)**

11. Write a short note on personal and methodic errors.

12. Discuss the types of pumps used in HPLC.

13. Draw and explain the working principle katharometer.

14. Outline the principle involved in the determination of phosphate by tubidimetry.

15. Discuss the determination of codeine-morphine mixture by fluorimetry.

16. Explain any two methods of sample injection systems in GC.

17. What is the molarity of a solution of sulfuric acid of specific gravity 1.19 and containing 13% H_2SO_4 by weight?

18. Write a brief note on the classification of ion selective electrodes.

19. Write a note on autotitrators.

20. Sketch and explain the TGA curve of calcium oxalate monohydrate.

21. What is polarographic maxima? How do they appear? What can be done to eliminate them?

22. Write a note on the classification of solvents with suitable examples.

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Part-C

Answer any FOUR questions. (4 × 10 = 40)

23a. Five determinations of ascorbic acid in a tablet gave the following results:
0.4049, 0.4043, 0.4039, 0.4041, and 0.4045. Calculate the average deviation, standard deviation and variance.

b. Mention the significance of capillary columns in GC. **(6+4)**

24a. What are the factors that influence fluorescence emission. **(6)**

b. Write a note on spectral interferences in AAS. **(4)**

25a. Draw the block diagram and explain the working principle of capillary electrophoresis.

b. How is temperature of the thermal compartment maintained in GC. **(8+2)**

26. Derive an expression for pH value for the neutralization of a salt of weak acid and a strong base considering K_w, K_h, K_a and concentration of salt.

27a. Write the illkovic equation and explain the terms in it. **(4)**

b. Mention the advantages and disadvantages of dropping mercury electrode. **(6)**

28a. What are the factors that influence TGA and DTA curves. **(6)**

b. Sketch and explain the DTA curve of copper sulphate pentahydrate. **(4)**

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