

Date : 26/10/2007

Dept. No.

Max. : 100 Marks

Time : 9:00 - 12:00

**PART – A**

Answer ALL questions.

(10 x 2 = 20 marks)

1. What is universal antidote? How is it prepared?
2. What are the mean and median for the number 821, 783, 834 and 855?
3. How does silanization reduce tailing of chromatographic peaks?
4. Name two common desiccants used in the desiccator.
5. Distinguish between the terms *end point* and *equivalence point*.
6. What are metallochrome indicators? Give an example.
7. What is a selective precipitant? Give an example.
8. List out the factors that affect the solubility of crystalline solids.
9. What is noise in an instrument and what is signal to noise ratio?
10. Calculate the vibrational degrees of freedom for i) O<sub>2</sub> and ii) CH<sub>4</sub>

**PART – B**

Answer any EIGHT questions.

(8 x 5 = 40 marks)

11. Describe the procedure of pipette calibration.
12. Explain the working principle of a single pan balance.
13. Describe the principle of TLC.
14. How is fractional distillation of liquid mixture carried out?
15. Write a note on theory of indicator behavior, using methyl orange as an example.
16. List out the requirements for reactions used in titrimetric analysis.
17. What are the requirements of a primary standard? Mention two examples of primary standard.
18. Explain the principle of Volhard titration of chloride ions.
19. Write a note on specific precipitants and sequestering agents.
20. The absorbance of a solution of concentration  $4.7 \times 10^{-5} M$  is 0.114 at 525 nm. in a 1.0cm cell. Calculate the molar absorptivity. What will be the percentage transmission for the same solution in a cell of path length 2.0 cm?
21. What are chromophores? Briefly describe  $n \rightarrow \pi^*$  and  $\pi \rightarrow \pi^*$  transitions.
22. What are the following? i) bathochromic shift ii) hypsochromic shift iii) hyperchromic shift and hypochromic shift.

**PART – C**

Answer any FOUR questions.

(4 x 10 = 40 marks)

23. What are different types of errors? How can they be minimized?
24. Explain the experimental set up for ion exchange chromatography. Mention two applications of the same.
25. a) Derive Henderson equation (5)  
b) In the titration of 15.00 mL of 0.200 M NaOH with 0.100 M HCl, calculate the pH for  $V_a = 0, 2.00, 20.00$  and  $30.00$  mL. ( $V_a$  is the volume units of acid).
26. a) Discuss the principle of titration using EDTA. (5)  
b) Find the solubility of  $PbBr_{2(s)}$  at  $25^\circ C$  if its solubility product at this temperature is  $3.90 \times 10^{-5}$  (5)
27. Distinguish between co precipitation and post precipitation. Discuss the various mechanisms by which co precipitation can occur.
28. State and explain Beer-Lambert's law. How is it verified? What are its limitations?

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