

LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – CHEMISTRY

FIFTH SEMESTER – November 2009

CH 5501 - ANALYTICAL CHEMISTRY

Date & Time: 2/11/2009 / 9:00 - 12:00 Dept. No.

Max. : 100 Marks

PART - A

ANSWER ALL THE QUESTIONS

(10 x 2 = 20 marks)

1. What first aid will you do if a student spills bromine in his hands?
2. Write answers on the basis of significant figures for the following:
 - a) $4.1 + 0.07 + 2.1$
 - b) $11 \times 0.122 / 10.0$
3. Name the types of resins used in ion exchange chromatography.
4. Define R_f .
5. Can we use phenolphthalein as indicator for the titration of Na_2CO_3 against HCl. Why?
6. Distinguish between end point and equivalence point
7. Enlist the factors that influence precipitation.
8. Write two indicators used for precipitation titrations.
9. Write the Boltzman distribution formula and explain the terms involved.
10. Draw the stretching modes of vibration of CO_2 molecule and label IR active ones.

PART – B

ANSWER ANY EIGHT QUESTIONS

(8 x 5 = 40 marks)

11. List out the differences between accuracy and precision
12. What are the advantages of a single pan balance over a double pan balance?
13. When is distillation done under reduced pressure? Draw a sketch of a distillation set.
14. Explain complexometric titration with an example .
15. Define chromophore and auxochrome. Give two examples each.
16. Write a note on ion-exchange chromatography.
17. What are the conditions for a good primary standard?
18. Derive Beer- Lambert's Law
19. Discuss on the theories of acid - base indicators.
20. Calculate the pH of a buffer solution containing 0.2M of acetic acid and 0.02 M of sodium acetate.(K_a of acetic acid = 1.8×10^{-5} at 25°C)
21. What are the factors that influence λ_{max} values?
22. Give the selection rules for electronic and vibrational transitions.

PART C

ANSWER ANY FOUR QUESTIONS

(4 x10 = 40 marks)

23. a) Write a detailed outline about the types of errors.
- b) Find out the (i) mean (ii) median and (iii) standard deviation for the following data : 89.2; 90.3; 87.9; 91.5; 90.7 (5+5)
24. a) Enlist five relative advantages of TLC over column chromatography
- b) When is Soxhlet extraction resorted to? Explain its principle with a diagram. (5+5)
25. a) An assay gave 10 ppm (by weight) contamination of chlorobenzene in drinking water. Calculate weight percent.
- b) Derive Henderson's equation for an acid buffer. (5+5)
26. a) How is Chloride estimated? (any one method)
- b) Give the differences between co-precipitation and post-precipitation. (5+5)
27. Define and give the significance of the following
- (a) line width
 - (b) signal to noise ratio
 - (c) molar extinction coefficient
28. a) Write the types of electronic transitions possible in
- (i) methane
 - (ii) methanol
 - (iii) acetaldehyde
- Justify your answer.
- b) Write briefly on complexometric indicators. (5+5)
