LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **MATHEMATICS**

FOURTH SEMESTER – **APRIL 2022**

UCH 4401 – APPLIED CHEMISTRY FOR MATHS

Date: 27-06-2022   Dept. No.   Max. : 100 Marks
Time: 09:00 AM - 12:00 NOON

Part-A

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

1. What is the role of universal antidote in a laboratory?
2. The volume of a liquid is 28.0 mL. A student measures the volume and finds it as 28.2 mL, 28.1 mL and 27.9 mL in the first, second and third trials respectively. Substantiate your answer with accuracy and precision.
3. Identify the indicators for the following titrations and justify your answer.
    (i) HCl *vs* NaOH   (ii) HCl *vs* Na_2CO_3
4. 0.100 mol of NaCl is dissolved in 100.0 g of pure water. What is the mole fraction of NaCl in the solution?
5. Define isoelectric point of an amino acid with an example.
6. What are oligosaccharides? Cite an example.
7. Distinguish between soaps and detergents.
8. Mention any four ingredients of shampoo.
9. Write the BIS specifications of drinking water.
10. List any four disadvantages of hard water.

PART- B

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

11. Discuss the importance of material safety data sheets in a laboratory.
12. Explain the types of errors encountered in analytical measurements.
13. What are the precautions to be taken in storage and handling of acids and poisonous chemicals?
14. (a) Find the molarity of a solution when 6.75 g of NaCl dissolved in 450 mL of water.
    (b) Calculate the normality of 100 mL solution containing 0.53 g of Na_2CO_3.   (3+2)
15. Differentiate the following:
    (i) Primary and secondary standards with examples (ii) End point and equivalence point
16. Describe any two tests with relevant equations to identify the presence of carbohydrates.
17. What are essential and non-essential amino acids? Cite examples.
18. Explain the mechanism involved in the cleansing action of soap.
19. Discuss the significances of consumer protection act, 2019.
20. How will you disinfect water using UV and ozone?
21. Explain alkaline and non-alkaline hardness of water. How can they be removed?
22. Describe the significance and measurement of chemical oxygen demand in polluted water.

PART- C

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

23a. Seven different samples of silver alloy were analysed for silver and were found to contain 19.8, 20.2, 19.4, 19.0, 20.3, 19.9 and 20.2 % of silver. Calculate the mean, standard deviation and coefficient of variation for the given set of data. (8)

b. Find significant figures in the following numbers. (2)
   (i) 0.05040   (ii) 14.22 + 1.025

24. Write the principle of complexometric titrations and mention the role of Eriochrome black-T in these titrations.

25. Discuss the types, sources, functions and diseases caused by the deficiency of fat-soluble vitamins.

26. Explain the following methods of analysis of lipids. (5+5)
   (i) Iodine value   (ii) Saponification value

27. Mention the properties and chemical formulation of any one type of cosmetic cream and shampoo.

28. Define water pollution. Explain the causes, effects and prevention of water pollution.

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