(6 pages)

S.No. 2679 **P 22 CHE 1 A**

(For candidates admitted from 2022–2023 onwards)

M.Sc. DEGREE EXAMINATION, NOVEMBER 2022.

Chemistry – Elective

ANALYTICAL CHEMISTRY

Time : Three hours Maximum : 75 marks

PART A — (20 marks)

Answer ALL questions.

I. (A) Multiple choice questions : (5 × 1 = 5)

1. Which of the following is the principle of Atomic Absorption Spectroscopy?

   (a) Radiation is absorbed by non-excited atoms in vapour state and are excited to higher states.

   (b) Medium absorbs radiation and transmitted radiation is measured

   (c) Colour is measured

   (d) Colour is simply observed

2. Paper Chromatography is a separatory technique that is used to separate ————.

   (a) Simple mixtures

   (b) Complex mixtures

   (c) Viscous mixtures

   (d) Metals

3. Which of the following option is appropriate for the TGA and DTA?

   (a) TGA and DTA measures only weight

   (b) TGA measures only weight while DTA measures other effects

   (c) TGA and DTA measures only temperature

   (d) TGA measures only temperature while DTA measures other effects

4. Which of the following components of the X-ray fluorescent spectrometer induces fluorescent radiation?

   (a) Excitation source

   (b) Energy analyser

   (c) X-ray spectrometer

   (d) Detection System

5. The ratio of concentration of titrant to the concentration of the analyte in amperometric titrations ideally should be

(a) 2

(b) 5

(c) 10

(d) 0.5

(B) Fill in the blanks : (5 × 1 = 5)

6. The possible transitions for water molecule in UV-visible region are ————————.

7. In thermogravimetric analysis, the result obtained appear as a ————————.

8. The size of a thin layer of adsorbent is about ————————.

9. The crystal used as X-ray grating has ———————— dimensional lattice arrays.

10. In normal phase HPLC there is ————————.

II. Answer the following questions : (5 × 2 = 10)

11. Illustrate the sampling techniques in IR spectroscopy.

12. Differentiate correlation and regression.

13. Write the salient feature of solvent extraction method.

14. What is an application of thermogravimetry analysis?

15. What is the principle involved in ion – sensitive electrode.

PART B — (25 marks)

Answer ALL questions, choosing either (a) or (b). (5 × 5 = 25)

16. (a) Write a brief note on theory and application of turbidimetry.

Or

(b) Mention the importance of FES.

17. (a) Illustrate with example about accuracy and precision.

Or

(b) Comparison of methods: means t-Test and paired t-Test.

18. (a) Describe in detail about the HPTLC techniques.

Or

(b) Discuss the principle and uses of GC-MS technique.

19. (a) Explain : Ilkovic equation.

Or

(b) How does the cyclic voltammetry work?

20. (a) State and explain about controlled potential coulometry.

Or

(b) What is the McReynold's constant and their uses?

PART C — (30 marks)

Answer any THREE out of Five questions.

(3 × 10 = 30)

21. Explain the principle and application of EXAFS.

22. Write short notes on the following :

(a) Standard deviation;

(b) Poisson distribution and Normal distribution

23. Describe the techniques involved in Thin-layer and column chromatography.

24. Discuss the special feature of synchronous fluorescence spectroscopy.

25. Account the following :

(a) Dropping Mercury Electrode;

(b) Ion selective field effect transistors

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