

(FOR THE CANDIDATES ADMITTED
DURING THE ACADEMIC YEAR 2025 ONLY)

SUB CODE **23PCY414**
REG.NO. :

N.G.M.COLLEGE (AUTONOMOUS) : POLLACHI

END-OF-SEMESTER EXAMINATIONS: MAY 2025

M.Sc CHEMISTRY

MAXIMUM MARKS: 75

SEMESTER IV

TIME: 3 HOURS

PART - III

23PCY414 – INSTRUMENTAL METHODS OF CHEMICAL ANALYSIS

SECTION – A

(10 X 1 = 10 MARKS)

ANSWER THE FOLLOWING QUESTIONS.

(K1)

1. Which test to be applied when number of observations is less than 30 and variance is not known
A. Z-test B. T-test C. F-test D. Chi-square test
2. In HPLC, which module is responsible for sample introduction?
A. Pump B. Injector C. Detector D. Column
3. Which spectroscopy is used for elemental composition of metals?
A. UV-Vis B. AAS C. IR D. Raman
4. In ESR spectroscopy, the g-value of a free electron is approximately:
A. 2.0023 B. 1.000 C. 3.1416 D. 0.500
5. Emission without a change in spin multiplicity
A. is called phosphorescence B. is called fluorescence C. is spin forbidden D. involves an intersystem crossing

ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES

(K2)

6. Define Precision
7. Why is UHPLC preferred over HPLC?
8. What is the role of a monochromator in spectroscopy?
9. Why does Fe^{3+} show a larger isomer shift than Fe^{2+} ?
10. State the Octant Rule

SECTION – B

(5 X 5 = 25 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS.

(K3)

11. a) Outline the median and standard deviation with example.
(OR)
b) Discuss about the errors and its classification
12. a) Explain the principle of Gas Chromatography and its components
(OR)
b) Compare UHPLC, and HPLC-MS in terms of efficiency and applications

(CONTD 2)

13. a) Describe the working principle and instrumentation of DSC
(OR)
b) Examine the applications of Atomic Absorption Spectroscopy
14. a) Analyze the significance of the g-value in ESR spectroscopy
(OR)
b) Interpret the quadrupole interactions in Mössbauer spectroscopy with example
15. a) Infer the Cotton effect with a suitable diagram
(OR)
b) Distinguish between fluorescence and phosphorescence

SECTION – C**(5 X 8 = 40 MARKS)****ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS.****(K4 (Or) K5)**

16. a) Analyze the correlation and regression
(OR)
b) Determine Q and F-test and its importance in data analysis
17. a) Illustrate the Principle, Instrumentation and Applications HPLC
(OR)
b) Distinguish the working principle of the following detectors with diagrams i) TCD ii) FID
18. a) Estimate the Instrumentation and Applications of TGA
(OR)
b) Describe the principle, instrumentation, and applications of Auger Electron Spectroscopy
19. a) Elaborate ESR spectroscopy is used in the identification of free radicals such as CH₃ and C₆H₅ radicals
(OR)
b) Explain quadrupole transitions in spherical and non-axially symmetric fields
20. a) Evaluate the phosphorescence spectroscopy
(OR)
b) Estimate the Principle and instrumentation of fluorometer.

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