

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2024
(Sixth Semester)

Branch – CHEMISTRY

INSTRUMENTAL METHODS OF CHEMICAL ANALYSIS

Time: Three Hours

Maximum: 50 Marks

SECTION-A (5 Marks)

Answer ALL questions

ALL questions carry EQUAL marks (5 x 1 = 5)

- 1 A student measures the length of an object to be 5.00 cm, but the actual length is 4.50 cm. What is the absolute error in this measurement?
(i) 0.50 cm (ii) 4.50 cm (iii) 0.05 cm (iv) 0.10 cm
- 2 The compound with IR absorption band at 1800 cm^{-1} would be an
(i) aryl ketone (ii) acid chloride
(iii) amide (iv) ester
- 3 _____ transition requires less energy
(i) $n - \pi^*$ (ii) $\pi - \pi^*$ (iii) $n - \sigma^*$ (iv) $\sigma - \sigma^*$
- 4 Which one of the following will not show ESR spectra?
(i) O_2 (ii) C_2H_5 (iii) N_2 (iv) Cu^{2+}
- 5 Which electrode is commonly used in Polarography to measure the current response?
(i) Platinum electrode (ii) Calomel electrode
(iii) Glassy carbon electrode (iv) Dropping mercury electrode

SECTION - B (15 Marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks (5 x 3 = 15)

- 6 a How are errors minimized?
OR
b Sketch the instrumentation of TGA and DTA.
- 7 a Describe the concept of polarizability.
OR
b State the Mutual Exclusion rule.
- 8 a Show the limitations of Beer-Lambert's law.
OR
b Bring out the hyperchromic and hypochromic shifts.
- 9 a Explain about the spin-spin splitting.
OR
b Organize the study of free radicals by applying ESR.
- 10 a Compare the organic and pulse polarography.
OR
b Explain about the Ilkovic equation.

Cont...

SECTION -C (30 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 x 6 = 30)

- 11 a Outline the thermometric titrations of HCl Vs NaOH.
OR
b Discuss the determination of the accuracy of methods in quantitative analysis.
- 12 a Discuss the basic instrumentation of double beam IR spectroscopy.
OR
b Compare the IR and Raman spectroscopy.
- 13 a Summarize the Frank-Condon principle.
OR
b Highlight the coulometric titration with examples.
- 14 a Elucidate the applications of NMR.
OR
b Discuss the g factor and hyperfine splitting in ESR.
- 15 a Point out the following, i) Residual current ii) Migration current.
OR
b Discuss the analytical applications of polarography.

Z-Z-Z

END