PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2017
(Sixth Semester)

Branch- **CHEMISTRY**

ANALYTICAL CHEMISTRY & INSTRUMENTAL METHODS OF ANALYSIS

Time : Three Hours Maximum : 75 Marks

SECTIONS (20 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** marks (10x2 = 20)

1 State the number of significant figures in each of the following
(i) 4.20 x 10^{10} (ii) 234.2 (iii) 6.004 (iv) 56780

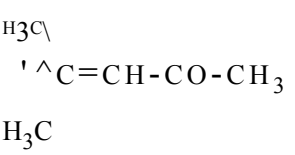
2 Write the factors which affect the thermogravimetric curve of a sample. *

3 .Calculate the theoretical number of vibrational degrees of freedom in (OCgH* (ii) H_20 (iii) $C0_2$ (iv) CH_4

4 Antistokes lines are weaker than stoke lines. Give reason.

5 State Beer's law.

6 Calculate the for the given structure



7 Define the term chemical shift.

8 Which of the following species may be studied by ESR.
(a) NO (b) N_2 (c) 0_2 (d) Cu^+

9 Write the advantages and limitations of dropping mercury electrode.

10 Write the Ilkovic equation and explain the terms involved in it.

SECTION - B (25 Marks)

' Answer **ALL** Questions

ALL Questions Carry **EQUAL** Marks (5x5 = 25)

11 a Detail the method of minimizing the errors.

OR

b Discuss the TGA curve of calcium oxalate monohydrate.

12 a Explain various sampling techniques used in IR spectroscopy.

OR

b Discuss any two applications of Raman spectroscopy.

13 a Write shbrt notes on colorimetric titration.

OR

b Give an account on Franck - Condon principle.

14 a Explain shielding and deshielding effects involved in NMR spectroscopy.

OR

b Calculate the ESR frequency of an unpaired electron in an'magnetic field 0.33 T (Tesla). Given for free electron g = 2, (3 = 9.273 x 10^{-24} JT and h = 6.626 x 1 O^{-34} JS.

15 a Explain the following (i) Residual current (ii) Migration current.

OR

b Derive an expression for the half wave potential. Give its significance in polarographic analysis.

SECTION - C (30 Marks)

Answer any THREE Questions

ALL Questions Carry EQUAL Marks (3 x 1 0 = 30)

16 a Discuss the least square methods for best fit line. (5)

b Explain the thermometric titrations of HC1 Vs NaOH. (5)

17 a Draw and explain the block diagram of an IR spectrometer. (5)

b Explain clearly the difference between IR spectra and Raman spectra. (5)

18 a Discuss any two applications of UV - Spectroscopy in quantitative analysis. (5)

b Draw and explain Duboseq colorimeter. (5)

19 a Draw the block diagram of an NMR instrument.Explain the function of each part. (5)

b Explain the mechanism of hyperfine interactions in the ESR spectrum CH_3 radical/ (5)

20 a Discuss the principle and working of polarography. (5)

b Write short notes on pulse polarography. (5)

Z-Z-Z END