SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN (AUTONOMOUS)
(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)
Chromepet, Chennai — 600 044.
M.Sc. - END SEMESTER EXAMINATIONS APRIL - 2022
SEMESTER - IV
20PCHET4005 - Analytical Techniques in Chemistry

Total Duration : 3 Hrs. **Total Marks : 60**

Section A

Answer any **SIX** questions $(6 \times 5 = 30$ Marks)

1. Explain the working method of photomultiplier tube.
2. Write a note on Stoke's and antistoke's lines.
3. a. Define chemical shift. (2)
   b. Why is TMS being used as reference compound in NMR? (3)
4. What is called by isomer shift? Explain it for Fe and Sn compounds in oxidation states?
5. Explain the hyperfine splitting of para-benzo semiquinone radical anion.
6. a. What is called by base peak? Give an example? (3)
   b. State Nitrogen rule (2)
7. What are the factors which affect TGA and DTA curves?
8. Write a brief account on atomizers.

Section B

Part A

Answer any **TWO** questions $(2 \times 10 = 20$ Marks)

9. Explain the instrumentation of infrared spectroscopy with block diagram.
10. Predict the number of signals with relative intensities of high resolution NMR spectrum of
    (i) Propanoic acid (ii) Acetal dehyde (iii) Benzyl alcohol.
11. Illustrate the hyperfine interaction of the following radicals.
    a. $[NO(SO_3)_2]^{2-}$ b. $[(NH_3)_5Co\text{-}O\text{-}O\text{-}Co(NH_3)_5]^{5+}$
12. a. Write down the principle and applications of mass spectroscopy (5)
    b. Predict the mass spectrum of (i) 2-Pentanol (ii) Benzyl acetate

Contd...

Part B

Compulsory question $(1 \times 10 = 10$ Marks)

13. Deduce the compound's structure using the following data
    The mass spectrum possesses a strong parent peak at m/e 122 (35%) plus peaks at m/e 92 (65%), m/e 91 (100%) and m/e 65 (15%).
    NMR signals obtained as follows:
    Triplet,δ 1.2, 2H, Triplet δ 3.63, 2H, Singlet, δ 4.8, 1H and Singlet δ 8.17, 5H.
    IR band at 3570cm-1, 1050cm-1, 2890cm-1and 3080cm-1

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