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(FOR THE CANDIDATES ADMITTED **22UCY611**

DURING THE ACADEMIC YEAR 20 ONLY) **REG.NO. :**

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

END-OF-SEMESTER EXAMINATIONS : MAY 2025

B.Sc CHEMISTRY **MAXIMUM MARKS: 50**

SEMESTER:VI **TIME : 3 HOURS**

PART - III

PHYSICAL METHODS AND CHEMICALSTRUCTURE

SECTION – A (10 X 1 = 10 MARKS)

ANSWER THE FOLLOWING QUESTIONS.(K1)

1. Which of the following causes the vibration of atoms?

a.) The number of protons contained in a nucleus.

b.) Electron movement to higher energy levels.

c.) The molecule's total molecular weight.

d.) Dipole moments between atoms.

2. What is the wavelength range of the UV spectrum?

(a) 100 nm to 500 nm (b) 200 nm to 800 nm

(c) 300 nm to 1000 nm (d) 400 nm to 1600 nm

3. The difference between the resonance frequency of the sample nucleus and the standard is called as

a) Raman shift b) Isomeric shift c) Isotopic shift d) Chemical shift

4. A mass spectrometer separates ions based on which of the following factors?

a)Mass b)Charge c) Molecular Weight d)Mass to charge ratio

5. Ferrites are materials

(a) Paramagnetic (b) Diamagnetic (c) Ferromagnetic (d) none of above

ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES (K2)

6. Define molecular spectroscopy.

7. What is Raman effect?

8. Which electromagnetic radiation is used in ESR?

9. What is the crystal structure of NaCl?

10. What are polar molecules? Give example.

SECTION – B (5 X 3 = 15 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS. (K3)

11. a) Discuss in detail about the patterns of spectral lines.

(OR)

b) List the uses of fingerprint region in IR spectroscopy

12. a) Compare and contrast IR and Raman spectroscopy

(OR)

b) Summarize and discuss Stokes and anti Stokes lines.

13. a) Outline hyperfine splitting in ESR spectroscopy.

(OR)

b) Explain the reference and solvents used in NMR spectroscopy.

14. a) How will you determine molecular ion peak in mass spectroscopy

(OR)

b) Write a note on radius ratio rule.

15. a) Summarize the effect of temperature on molecular polarization

(OR)

b) Compare and contrast different magnetism.

SECTION – C (5 X 5 = 25 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS. (K4/K5)

16. a) Explain the molecular vibrations using harmonic oscillator.

(OR)

b) Discuss the factors affecting carbonyl stretching frequency.

17. a) Explain the Woodward Fisher rule for absorption maxima of dienes

(OR)

b) Classify and explain the types of electronic transitions.

18. a) Deduce the factors affecting the chemical shift values in NMR spectroscopy.

(OR)

b) Explain the ESR lines of methyl radical.

19. a) Sketch and explain the crystal structure of zinc sulphide.

(OR)

b) Explain though Schottky and Frenkel defects in solids

20. a) Determine molecular susceptibility of a paramagnetic substance using guy balance

(OR)

b) Explain the application of dipolemoment in the study of simplemolecules.

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