QP CODE: 24803624

24803624

Reg No : .....

Name : .....

INTEGRATED MSC DEGREE EXAMINATION, JUNE 2024

Fifth Semester

INTEGRATED MSC BASIC SCIENCE-CHEMISTRY

CORE - ICH5CR04 - PHYSICAL CHEMISTRY II

2020 Admission Onwards

9709864A

Time: 3 Hours Weightage: 30

Part A (Short Answer Questions)

*Answer any **eight** questions.*

*Weight **1** each.*

1. Name the molecules showing rotational spectroscopy.
2. Explain Chemical Analysis by Microwave Spectroscopy.
3. Write short note on normal modes of vibration.
4. Outline the basic principle in Raman Spectroscopy.
5. Find the advantages of Raman spectroscopy over IR Spectroscopy.
6. Find the reason for water is colourless while milk is white.
7. Give the principles of NMR.
8. In a spectrometer operating at 1 T, the NMR frequency of 19F is 40.06 MHz. Calculate the magnetogyric ratio of 19F.
9. State the Grothus- Draper law.
10. Write a note on internal conversion and intersystem crossing for photochemical processes.

(8×1=8 weightage)

Part B (Short Essay/Problems)

*Answer any **six** questions.*

*Weight **2** each.*

11. Write a note on electromagnetic radiation. Plot different regions of electromagnetic spectrum and explain each region.
12. Explain a) Transition probability b) population of states c) path length of the sample.

13. Discuss the selection rules of microwave spectroscopy.

14. Explain the origin of IR spectroscopy and give its applications

15. Compare IR spectroscopy with microwave spectroscopy.

16. Discuss the principles and hyperfine structure in ESR spectroscopy.

17. Differentiate between primary and secondary photochemical processes.

18. Illustrate ozone layer in the environment.

(6×2=12 weightage)

Part C (Essay Type Questions)

*Answer any **two** questions.*

*Weight **5** each.*

19. Find the qualitative description of nonrigid rotator.

20. Explain a) combination bands and b) difference bands. Evavaluate and draw normal modes of vibration of water and CO2 molecule.

21. Explain vibrational coarse structure spectrum and rotational fine structure of electronic spectrum.

22. Discuss quantum yield. Explain primary and secondary processes in photochemical reactions. Give reasons for low and high quantum yields with example.

(2×5=10 weightage)