



K24U 0021

Reg. No. :

Name :

Sixth Semester B.Sc. Degree (C.B.C.S.S. – OBE-Regular/Supplementary/
Improvement) Examination, April 2024
(2019 to 2021 Admissions)

CORE COURSE IN CHEMISTRY/POLYMER CHEMISTRY
6B16CHE/PCH : Physical Methods in Chemistry

Time : 3 Hours

Max. Marks : 40

SECTION – A

Answer **all** questions. **Each** question carries **one** mark.

1. What is central strong line in Raman spectrum called ?
2. Give an example for a molecule having centre of symmetry.
3. Give any two examples for chromophores.
4. What is the Schoenflies notation for the molecule NH_3 ? (4×1=4)

SECTION – B

Answer **seven** questions out of 10. **Each** question carries **2** marks.

5. What is molar extinction coefficient ?
6. Antistokes lines are much less intense than stokes lines. Why ?
7. State Frank-Condon principle.
8. State the difference between principle axis and subsidiary axis.
9. Define moment of inertia. Write the equation for moment of inertia.
10. What is Born-Oppenheimer approximation ?
11. How the nanomaterials are classified based on dimensions ?
12. Give any two applications of carbon nanotubes.
13. Using Woodward-Fieser rule, calculate λ_{max} for Hept-3-ene-2-one.
14. State Beer-Lamberts law. (7×2=14)

P.T.O.

K24U 0021



SECTION – C

Answer **four** questions out of 6. **Each** question carries **3** marks.

15. Explain the intensity shift in UV spectroscopy.
16. Assign the point group for NH_3 molecule.
17. Write the Z-matrix for H_2O molecule.
18. Explain the concept of force field in computational chemistry.
19. Explain the factors influencing the vibrational frequency.
20. Explain the terms base peaks and molecular ion peaks. (4×3=12)

SECTION – D

Answer **two** questions out of 4. **Each** question carries **5** marks.

21. Draw the NMR spectra of the following molecules and interpret the peaks.
 - a) Ethyl bromide
 - b) Acetone.
22. Explain the following terms :
 - a) Fundamental bands and overtone bands
 - b) Hot bands and Fermi resonance.
23. Explain the selection rules for rotational spectra.
24. Explain the following characterization techniques for nanomaterials.
 - a) SEM
 - b) TEM. (2×5=10)