

B.Sc. Semester - 5 (CBCS) Examination
Oct/Nov - 2024 (NEW COURSE)
Spectroscopy and Optics(Core)

Time: 2:30 Hours**Marks: 70****Instructions:**

1. All questions are compulsory.
2. Figures to the right indicate marks.

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- Que.1(A) Answer the following question. (Any Two) (10)
1. Write note on Production of Spectra.
 2. Explain Franck-Hertz Experiment.
 3. Explain Classical Interpretation of Normal Zeeman Effect.
- Que.1(B) Answer the following question. (Any One) (04)
1. Explain Magnetic Orbital Quantum Number and Magnetic Spin Quantum Number.
 2. Write short note on experimental study of Zeeman Effect.
- Que.2(A) Answer the following question. (Any Two) (10)
1. Explain theory of Pure Rotational Molecular Spectra.
 2. Explain theory of Pure Rotational-Vibration Molecular Spectra.
 3. Discuss classical theory of Raman Effect.
- Que.2(B) Answer the following question. (Any One) (04)
1. Explain theory of Electronic Band Molecular Spectra.
 2. Explain observation of Raman Spectra.
- Que.3(A) Answer the following question. (Any Two) (10)
1. Explain continuous X-ray Spectrum.
 2. Describe Bragg's Spectrometer.
 3. Write a note on Rotating Crystal Method.
- Que.3(B) Answer the following question. (Any One) (04)
1. Explain production of X-rays.
 2. An x-ray tube operating at 50 kv produces continuous x-ray spectrum. If $h=6.624 \times 10^{-34}$ Js, $e=1.6 \times 10^{-19}$ coulomb and $c=3 \times 10^8$ m/s. Find the short wavelength limit.
- Que.4(A) Answer the following question. (Any Two) (10)
1. Write a note construction and working of Michelson's Interferometer.
 2. Derive intensity distribution formula for Multiple Beam Interference.
 3. Discuss about Fabry-Perot Interferometer.
- Que.4(B) Answer the following question. (Any One) (04)
1. Write any two applications of Michelson Interferometer.
 2. Explain Lummer and Gehrcke Plate with neat diagram.
- Que.5(A) Answer the following question. (Any Two) (10)
1. Explain any two types of Production of Plane Polarized Light.
 2. Describe the construction and action of a Nicol Prism. Explain its working as a Polarizer and Analyzer.
 3. Explain applications of Polarized Light.
- Que.5(B) Answer the following question. (Any One). (04)
1. State and prove Malus Law.
 2. A Ray of Light is incident on the surface of a glass plate of refractive index 1.55 at the Polarizing Angle. Calculate the angle of Refraction.
