

B.Sc. Semester - 5 (CBCS) Examination
Oct/Nov - 2023 (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 discontinuous spectra.
 2. Write note on Bohr's theory of an atom.
 3. Write short note on vector atom model and normal Zeeman effect.
- Que.1(B) Answer the following question. (any one) (04)
1. Explain Franck-Hertz experiment.
 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 Raman effect and its salient features.
- Que.3(A) Answer the following question. (any two) (10)
1. Explain production of x-rays.
 2. Describe Bragg's spectrometer.
 3. Write a note on powder crystal method.
- Que.3(B) Answer the following question. (any one) (04)
1. Write properties of x-rays.
 2. An x-rays 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 any two applications of Michelson interferometer.
 2. Discuss about Fabry-Perot interferometer.
 3. Explain Lummer and Gehrcke plate with neat diagram.
- Que.4(B) Answer the following question. (any one) (04)
1. Explain the Twyman and green interferometer.
 2. If 115 fringes cross the field of view of a Michelson interferometer when the movable mirror is moved through 0.0258 mm. calculate the wavelength of light used.
- Que.5(A) Answer the following question. (any two) (10)
1. Explain elliptically and circularly polarized light.
 2. Write a note on double refraction in calcite prism.
 3. Write a note on Nicol prism.
- Que.5(B) Answer the following question. (any one) (04)
1. State and prove Malus law.
 2. Write applications of polarized light.
