

B.Sc. Semester - 5 (CBCS) Examination
December -2020 (NEW COURSE)
Spectroscopy and Optics(Core)

Time: 1:30 Hours**Marks: 42****Instructions:**

1. Figures to the right indicate marks.
 2. There are five questions in the question paper.
 3. Answer any three of the following questions.
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1(a) Answer the following question (any two). (10)

- (1) Write note on Bohr's theory of an atom.
- (2) Explain quantum number and their physical interpretations.
- (3) Explain classical interpretation of normal Zeeman effect.

1(b) Answer the following question (any one). (4)

- (1) Explain Franck-Hertz experiment.
- (2) Write short note on experimental study of Zeeman effect.

2(a) Answer the following question (any two). (10)

- (1) Write a note on experimental study of molecular spectra.
- (2) Explain theory of pure rotational molecular spectra.
- (3) Discuss classical theory of Raman effect.

2(b) Answer the following question (any one). (4)

- (1) Explain theory of electronic band molecular spectra.
- (2) Discuss the exciting source and sample tube Raman spectra.

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 powder crystal method.

3(b) Answer the following question (any one). (4)

- (1) Explain production of x-rays.
- (2) Write properties of x-rays.

4(a) Answer the following question (any two). (10)

- (1) Write a note construction and working of Michelson's interferometer.
- (2) Explain the Twyman and Green interferometer.
- (3) Discuss about Fabry-Perot interferometer.

4(b) Answer the following question (any one). (4)

- (1) Write any two applications of Michelson interferometer.
- (2) Explain Lummer and Gehrcke plate with neat diagram.

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 types of polarized light.

5(b) Answer the following question (any one). (4)

- (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.