647510 **BSc5PhyC503x** **Seat No :_____**

B.Sc. Semester - 5 (*CBCS*) Examination
Oct/Nov - 2022 (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.

Q.1 (a) Answer any two questions: 10

(1) Explain types of spectra.

(2) Explain quantum number and their physical interpretation.

(3) Write a note on experimental study of Zeeman effect.

(b) Attempt any one: 04

(1) Explain Stark effect.

(2) Write a note on Paschen-Back effect.

Q.2 (a) Answer any two questions: 10

(1) Explain theory of rotational-vibrational spectra.

(2) Explain classical theory of Raman effect.

(3) Explain quantum theory of Raman effect.

(b) Attempt any one: 04

(1) Write a note on electronic band spectra.

(2) Write application and importance of Raman spectra.

Q.3 (a) Answer any two questions: 10

(1) Obtain the expression for Bragg's law.

(2) Explain the concept of reciprocal lattice.

(3) Explain powder crystal method for X-ray diffraction.

(b) Attempt any one: 04

(1) Find the wavelength of 2^{nd} order X-rays by NaCl crystal at an angle of 5^{o}. The grating element of NaCl crystal is 2.81 A^{o}.

(2) Write the properties of X-rays.

Q.4 (a) Answer any two questions: 10

(1) Explain experimental study of Michelson's interferometer.

(2) Write a note on Twyman & Green interferometer.

(3) Explain multiple beam interference.

(b) Attempt any one: 04

(1) Explain application of Michelson interferometer.

(2) Write a note on Lummer-Gehrcke plate.

Q.5 (a) Answer any two questions: 10

(1) What is double refraction? explain double refraction in calcite prism.

(2) Write short note on Nicol prism.

(3) Explain the production of plane polarised light.

(b) Attempt any one: 04

(1) Explain any one application of polarised light in detail.

(2) Explain Malus law.

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