

B.Sc. Semester - 5 (Remedial) (CBCS) Examination
Feb/Mar. -2021 (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 any two questions: | 10 |
| (1) Write a note on Frank-Hertz experiment. | |
| (2) Explain quantum numbers and their physical interpretation. | |
| (3) Explain classical interpretation of Normal Zeeman effect. | |
| (b) Attempt any one : | 04 |
| (1) Explain the space(special) quantization. | |
| (2) Write a note on Stark effect. | |
| 2. (a) Answer any two questions: | 10 |
| (1) Explain the theory of pure rotational spectra. | |
| (2) Explain theory of rotational vibrational spectra. | |
| (3) Explain experimental arrangement of Raman spectra. | |
| (b) Attempt any one : | 04 |
| (1) Explain the theory of Electronic band spectra. | |
| (2) Give applications of Raman spectra. | |
| 3. (a) Answer any two questions: | 10 |
| (1) Obtain the expression of Bragg's law and write the important conclusions. | |
| (2) With neat diagram explain Bragg's spectrometer. | |
| (3) Explain powder diffraction method for X-rays. | |
| (b) Attempt any one : | 04 |
| (1) Write properties of X-rays. | |
| (2) Find the wavelength of 2 nd order X-rays by NaCl crystal at an angle of 5.5°. The grating element of NaCl crystal is 2.81 Å. | |
| 4. (a) Answer any two questions: | 10 |
| (1) Explain construction of Michelson's interferometer. | |
| (2) Write a note on Mach-Zehnder interferometer. | |
| (3) Explain multiple beam interference. | |
| (b) Attempt any one : | 04 |
| (1) Write a note on Lummer-Gehrcke plate. | |
| (2) Explain use of Michelson's interferometer to determine the difference of two wavelengths. | |
| 5. (a) Answer any two questions: | 10 |
| (1) Explain types of polarisation. | |
| (2) Write a note on Nicol prism. | |
| (3) Explain double refraction in calcite prism. | |
| (b) Attempt any one : | 04 |
| (1) What is polarisation? Explain difference between polarised and non-polarised light. | |
| (2) Explain Malus law. | |
