# B. Sc. (Sem. V) (CBCS) Examination

## October / November - 2018

## Physics : Paper - 503

### (Optics & Spectroscopy) (Old Course)

### Faculty Code : 003
### Subject Code : 001503

Time : $2\frac{1}{2}$ Hours]                                    [Total Marks : 70

**Instructions :** (1) All questions are compulsory.

(2) Figure on right hand side indicate full marks.

(3) Symbols have their usual meaning.

1  Fill in the blanks with proper answer.                          **20**

(1) Michelson interferometer is working on the principle of _____.

(2) Nicol prism is based on the action of _____.

(3) Full form of LCD is _____.

(4) Full form of TEM is _____.

(5) A quarter wave plate introduces phase difference between e-ray and o-ray is _____.

(6) If S = O and J = L then the value of Lande factor g is _____.

(7) If Raman shift $\Delta V$ is negative then the lines are called _____.

(8) The doublet of the sodium D lines is separated by _____ A°.

(9) Most complex molecular spectra is _____.

(10) The Zeeman effect is a _____ phenomenon.

(11) The induced birefringence is given by the equation _____.

(12) Relation between J, L and S is _____.

(13) In normal Zeeman effect the middle missing component is known as _____.

(14) Light waves are transverse in nature, can be demonstrated by observing the penomenon of _____.

(15) Full form of SEM is _____.

(16) Calcite is _____ crystal.

(17) Relation between $\mu_o$ and $\mu_e$ for calcite crystal is _____.

(18) The thickness of a thin transparent sheet is obtained with M. I. is measured by the equation _____.

(19) Raman lines are _____.

(20) Visibility if fringes due to interference of two beams of light whose path difference is variable is given by the relation _____.

2  (a)  Answer any **three** in brief :                                6

    (1)  What do you mean by interferometer ?

    (2)  Define optical axis ?

    (3)  Give the limits of TEM.

    (4)  What is Zeeman effect ?

    (5)  What is double refraction ?

    (6)  What is Raman effect ?

  (b)  Answer any **three** :                                       9

    (1)  What is half-wave and quarter wave plates ?

    (2)  What is difference between ordinary and extra-ordinary rays ?

    (3)  Explain use of M. I. to determine the difference in the wavelength of two waves.

    (4)  Differentiate Raman spectra and fluorescence spectra.

    (5)  Explain space quantization.

    (6)  Write importance of Raman effect.

  (c)  Answer any **two** in details :                            10

    (1)  Explain construction of Michelson's interferometer with neat diagram.

    (2)  Describe the construction of Babinet's compensator.

    (3)  Write a note on Lummer Gehreke plate.

    (4)  Explain the theory of pure rotation spectra.

    (5)  Explain quantum theory of Raman effect.

**3**  (a)  Answer any **three** in brief :  **6**

(1)  Why the glass plate $G_2$ in M. I. is known as compensating plate ?

(2)  What do you mean by polarisation of light ?

(3)  What is Stark effect ?

(4)  What is anisotropic crystal ?

(5)  Explain Stokes's lines in Raman effect.

(6)  Write applications of L. G. Plate.

(b)  Answer any **three** :  **9**

(1)  What do you mean by elliptically polarised light ?

(2)  Write use of Raman effect in chemistry ?

(3)  What is polariser and analyzer ?

(4)  Write note on quantum Nos.

(5)  Explain Kerr effect.

(6)  Explain LCDs.

(c)  Answer any **two** in details :  **10**

(1)  Explain Nicol prism with necessary diagram.

(2)  Give Huygen's explanation of double refraction.

(3)  Give principle and application of SEM.

(4)  Explain vector atom model and anomalous Zeeman effect.

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

———————————