



BCH-003-001503

Seat No. _____

B. Sc. (Sem. V) (W.E.F. 2012) Examination

August - 2021

503 - Physics

(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) Symbols have their usual meaning.
(3) Figure on right side indicate marks.

1 Write very short answers to the following questions. **20**

- (1) Visibility of fringe in M.I. is given by _____.
- (2) The τ in multiple reflection is known as _____.
- (3) Lummer-Gehrcke plate is used for observing _____.
- (4) Liquid crystal display work on _____ phenomenon.
- (5) Full form of LCD is _____.
- (6) Calcite, quartz and tourmaline are _____ crystals.
- (7) Full form of TEM is _____.
- (8) Full form of AFM is _____.
- (9) Full form of SEM is _____.
- (10) _____ quantum number gives the energy of e^- .
- (11) Orbital quantum number (l) defines _____ of an orbital.
- (12) m_s can have only values _____.
- (13) The kinetic energy of the rotating molecule is _____.
- (14) Band spectra are produced by _____.
- (15) The vibrational energy of molecule is given by
 $E_V =$ _____
- (16) _____ gives the equation of Roman shift.

- (17) In _____ spectra the line frequency is always less than the incident frequency.
- (18) For Roman effect if ΔV is negative then we obtain _____.
- (19) For normal zeeman effect, frequency shift is _____.
- (20) _____ is responsible for stark effect.

2 Answer the following :

- (a) Write short answers to the following : (any three) **6**
- (1) Write the principle of Michelson's Interferometer.
 - (2) What is Febry-Perot interferometer ?
 - (3) What is Polarizer and Analyzer ?
 - (4) What is calcite crystal ?
 - (5) Write name of essential components of all SEMs.
 - (6) Write applications of SEM.
- (b) Give answers to the following : (any three) **9**
- (1) Explain construction and working of MI.
 - (2) Explain Lummer-Gehrcke plate with necessary diagram.
 - (3) Explain LCDs.
 - (4) Explain cotton-mount effect.
 - (5) Write applications of SEM and TEM.
 - (6) What is half wave plate ?
- (c) Give answers to the following : (any two) **10**
- (1) Explain Nichol prism with necessary diagram.
 - (2) Explain Fabry-Perot interferometer.
 - (3) Give Huygen's explanation of double refraction.
 - (4) Explain super position of waves linearly polarized at right angle.
 - (5) Explain the working principle of SEM with neat schematic diagram.

3 Answer the following :

(a) Write short answers to the following : (any three) **6**

- (1) What is principal quantum number ?
- (2) What is Paschen back effect?
- (3) What is Raman effect ?
- (4) Write any four applications of Raman spectra and Fluorescence spectra.
- (5) Write the difference between Zeeman effect and Paschan Back effect.
- (6) What is orbital quantum number ?

(b) Give answers to the following : (any three) **9**

- (1) Describe : Paschen-Back effect.
- (2) Write note on “Stark Effect”.
- (3) Explain rotational vibrational spectra.
- (4) Explain electronic band spectra.
- (5) Give the comparison between Raman spectra and Fluorescence spectra.
- (6) Explain : An orbital quantum number (l).

(c) Write in detail : (any two) **10**

- (1) Explain vector atom model and normal zeeman effect.
- (2) Explain : The classical theory of Raman effect.
- (3) Explain quantum theory of Raman effect.
- (4) Explain pure rotational spectra.
- (5) Vector Atom Model and Anomalous zeeman effect are explain in detail.
