* R P - 0 0 3 - 0 0 1 5 0 3 *

RP-003-001503

Seat No. _____

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

February - 2019

Physics : Paper - 503

(Optics & Spectroscopy)

Faculty Code : 003

Subject Code : 001503

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

Instructions : (1) Give answers of all the questions in given answer sheet.

(2) All questions are compulsory.

(3) Symbols have their usual meaning.

(4) Figure on the right hand side indicates full marks.

1 Answer the following : (Each of **one** mark) **20**

(1) In Michelson interferometer, circular fringes are obtained when mirror M_1 and M_2 are exactly _____ to each other.

(2) Cotton Mouten effect is called _____ type of artificial double refraction effect.

(3) A compensator is an optical devices whose function is to compensate _____.

(4) Lummer- Gehreke plate works on the principle of multiple beam interference. (True/false)

(5) What is the thickness of a thin transparent sheet if obtained with Michelson interferometer ?

(6) An artificial double refraction induced by _____.

(7) $\Delta\mu$ is positive for positive crystal. (True/false)

(8) A phase difference arises between e-rays and o-rays is given by δ = _____.

(9) SEM is an acronym for _____.

(10) Which optical devices are used to change the state of polarization of an incident wave ?

(11) Which are the most complex molecular spectra ?

(12) $\Delta v = v_i - v_s$ gives the equation of Raman shift. (True/False)

(13) Who did put forward the hypothesis of electron spin in 1925 ?

(14) Paschen back effect follows *l-s* coupling. (True/False)

(15) Orbital quantum no. is denoted by symbol _____.

(16) What is the change in the frequency in normal Zeeman effect ?

(17) In Anamalous Zeeman effect the component separation is governed by the factor which proportional to $\Delta m_j g$. (True/False)

(18) What is responsible for Stark effect ?

(19) One end of the Raman tube is 'horn' shaped and blackened why ?

(20) In normal Zeeman effect, which component is missing, when observed in parallel direction ?

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

(1) What is Michelson interferometer ?

(2) Mention types of polarized light.

(3) State the principle of TEM.

(4) State the principle of Nicol Prism.

(5) What is Kerr effect ?

(6) Explain double refraction.

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

(1) Discuss the circular fringes obtained in Michelson interferometer.

(2) Discuss construction of Michelson interferometer with figure.

(3) Explain Anisotropic crystals.

(4) Explain Pockels effect.

(5) Advantages and disadvantages of AFM.

(6) What is half wave plate ?

(c) Attempt any **two** : **10**

(1) Explain Multiple Beam interference in detail.

(2) Discuss Febry- Perot interferometer in detail.

(3) Explain in detail SEM.

(4) Explain Babinet compensator with necessary diagram.

(5) Give Huygen's explanation of Double refraction.

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

(1) What is concept of 'spinning electron' ?

(2) What is the molecular spectroscopy ?

(3) Explain the 'band' in molecular spectra.

(4) What is orbital quantum number ?

(5) What is Paschen - Back effect ?

(6) Draw the experimental set up for Raman effect.

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

(1) Explain Space quantization.

(2) What is total magnetic Quantum no. ?

(3) Application of Raman spectra.

(4) Give comparison between Raman spectra and Fluorescence spectra.

(5) What is Stark effect ?

(6) What are rotational-vibrational spectra ?

(c) Attempt any **two** : **10**

(1) What is Normal Zeeman effect ? Explain classical interpretation of it.

(2) Explain vector atom model and Anomalous Zeeman effect.

(3) Explain the theory of pure rotational spectra.

(4) Explain quantum theory of Raman effect.

(5) Explain electronic band spectra.
