



BBB-003-0496003 Seat No. _____

**B. Sc. / M. Sc. (Applied Physics) (Sem. VI) (CBCS)
Examination**

June / July - 2021

**Experimental Techniques in Physics. : Paper - XXII
(New Course)**

Faculty Code : 003

Subject Code : 0496003

Time : $2\frac{1}{2}$ Hours]

[Total Marks : 70

- Instructions :** (1) Attempt Any Five questions.
(2) Numbers in the right margin indicate marks

1 Answer the following questions : **14**

- (1) Describe how a Nicol prism can be used as an analyzer.
- (2) Explain the splitting of sodium D lines transverse and longitudinal to the applied magnetic field with necessary figures.
- (3) What is LCD? How polarisation is used in LCD.
- (4) What is space quantization?
- (5) Write the application of Nicol prism.
- (6) Write down the selection rules for the spectral lines.
- (7) Explain in short: Lo Surdo's method for effect of electric field on spectral lines.

2 Answer the following questions : **14**

- (1) Define interference. Give the examples of interference of division of wave front and division of amplitude.
- (2) Why G_2 plate is known as compensating plate in Michelson Interferometer?
- (3) State and Explain Brewster's law.
- (4) What is anisotropic crystal?

- (5) Write down the intensity rules for the spectral lines.
- (6) Draw a well labelled diagram of the Raman setup in pre laser era.
- (7) What is Raman Effect?
- 3** Answer the following questions : **14**
- (1) Deduce an expression for the intensity distribution in fringes for Fabry Perot Interferometer.
- (2) Write a note on Lummer - Gehrcke plate.
- 4** Answer the following questions : **14**
- (1) Explain principle for the formation of Newton's ring and derive the equation for darker and brighter ring.
- (2) Describe construction and working of Michelson's Interferometer (M.I.). Explain why G_2 plate is known as compensating plate?
- 5** Answer the following questions : **14**
- (1) Write a detailed note on Babinet's compensator.
- (2) Explain the construction, principle and use of (i) quarter wave plate and (ii) half wave plate.
- 6** Answer the following questions : **14**
- (1) Discuss Nicol prism in detail.
- (2) Describe theory of production of linearly, elliptically and circularly polarized light.
- 7** Answer the following questions : **14**
- (1) Explain anomalous Zeeman Effect in detail.
- (2) (a) Write a detailed note : Vector Atom Model. **4**
- (b) Explain the concept of spinning electron. **3**
- 8** Answer the following questions : **14**
- (1) Explain Zeeman Effect with Lorentz explanation on the basis of classical electron theory.
- (2) How Debye explained the normal Zeeman Effect? Derive equation for frequency shift.

- 9** Answer the following questions : **14**
- (1) What is the importance of Raman Effect? Write a detailed note: Applications of the Raman Effect in physics.
 - (2) Explain the theory of pure rotational spectra in detail. How the validity of the theory can be tested?
- 10** Answer the following questions : **14**
- (1) Explain theory of the rotation-vibration spectra in detail.
 - (2) Write a detailed note: Electronic band spectra.
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