

Roll No.

3005

**B. Tech. 1st Semester (Bio-Tech.)
Examination – February, 2022**

**OPTICS, OPTICAL FIBRE, MAGNETISM AND
QUANTUM MECHANICS**

Paper : BSC-PHY-105-C

Time : Three Hours]

[Maximum Marks : 75

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt five questions in all selecting one question from each Unit. Question No. 1 is compulsory.

1. (a) What is the relation between phase difference and path difference ?
- (b) Write a short note on population inversion.
- (c) Give some application of fibre optics.
- (d) Define the photo electric effect.

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(e) What is Heisenberg uncertainty principle ?

(f) What is diffraction ? What are type of diffraction ?

$$6 \times 2.5 = 15$$

UNIT - I

2. What is a plane transmission grating ? Describe how would you employ it for determining the wavelength of light. 15

3. What do you understand by double reflection ? Explain how would you use the phenomenon to produce plane polarize and circularly polarize light ? 15

UNIT - II

4. What are the specialities of laser light ? Give the construction and working of He-Ne laser. 15

5. Explain the construction of an optical fibre. What do you understand by single and multimode optical fibres ? Explain. 15

UNIT - III

6. What is equation of continuity ? Explain. How could Maxwell correct and present ampere's law in its generalized form ? 15

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7. Differentiate diamagnetic, paramagnetic and ferromagnetic materials on the basis of their magnetic susceptibility. How will you explain the difference in their behaviour ? 15

UNIT - IV

8. What is Compton effect ? Drive an expression for the change in wavelength of the scattered photon in Compton effect. 15

9. Derive Schrodinger's time dependent and time independent equation for matter waves. Give physical interpretation of the wave function. 15

3005- (P-3)(Q-9)(22) (3)