

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Sem.-1,2)
OPTICS & ELECTROMAGNETISM

Subject Code : BTPH-106-18

M.Code : 75366

Date of Examination : 20-01-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying EIGHT marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

1. Write briefly :

- a) Write any two characteristics of diffraction grating.
- b) Define the term double refraction.
- c) Which type of pumping is required for Ruby laser?
- d) What is the need to achieve population inversion?
- e) Define Gauss law.
- f) Write the laws of magnetism.
- g) Write the losses associated with optical fibres.
- h) What is ferromagnetism?
- i) Find de Broglie wavelength of neutrons if they are incident on a crystal having interatomic spacing of 1.5 \AA ; if first order diffraction at an angle of 50° is happening,
- j) Write the physical significance of wave function.

SECTION-B

2. Obtain the Fraunhofer diffraction pattern produced by a single slit using suitable diagrams.
3. Discuss the production of linearly, elliptically and circularly polarized light.
4. Write a note on total internal reflection. Derive an expression for numerical aperture of an optical fibre.
5. Specify three possible types of transitions between two atomic energy levels and derive relations between Einstein's coefficients.

SECTION-C

6. What is dielectric polarization? Derive and explain Clausius-Mossotti equation.
7. Write, explain and derive Maxwell's four equations.
8. Describe Davisson-Germer's experiment to explain the wave nature of electrons.
9. Derive time dependent and time-independent Schrodinger wave equation.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.