

- d) Discuss working of CO₂ laser. What is the role of N₂ in CO₂ laser.

OR

Name the various types of optical fibers. Discuss the single distortion in optical fiber.

BE - 201

B.E. I & II Semester

Examination, June 2015

Engineering Physics

Time : Three Hours

Maximum Marks : 70

- Note:* i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.
- ii) All parts of each questions are to be attempted at one place.
- iii) All questions carry equal marks, out of which part A and B (Max.50 words) carry 2 marks, part C (Max.100 words) carry 3 marks, part D (Max.400 words) carry 7 marks.
- iv) Except numericals, Derivation, Design and Drawing etc.

Unit - I

1. a) Discuss the concept of De-Broglie matter waves.
- b) The uncertainty in the location of a particle is equal to its De-Broglie wave length. Calculate the uncertainty in its velocity.
- c) Discuss the concept of probability density. Also define the wave function ψ .
- d) What is 'Compton effect'? Obtain an expression for the shift in wave length of X-ray beam.

OR

Deduce schrodinger time independent wave equation.

Unit - II

2. a) Discuss difference between 'Interference and Diffraction' of light.
- b) What is Brewster's law?
- c) A plane transmission grating having 6000 lines/cm. is used to obtain a spectrum of light from a sodium lamp in the second order. Calculate the angular separation between the two lines whose wavelengths are 5890\AA and 5896\AA .
- d) Explain the working of Michelson's interferometer. How will you produce circular fringes with it? What is the use of compensating plate in it?

OR

Describe the construction of a Nicol-Prism and show how it can be used as a polarizer or as an analyser.

Unit - III

3. a) Why do we say that a nucleus behaves like a drop of liquid?
- b) In a certain betatrons. The maximum magnetic field at the orbit was 0.4 Wb/m^2 ; operating at 50 Hz with a stable orbit diameter 1.524 m. Calculate the final energy of the electrons.
- c) Discuss the limitations of a cyclotron.

- d) Explain the principle and working of an Aston's mass spectrograph. Derive the condition for its focussing.

OR

Describe construction and working of Geiger-Muller counter.

Unit - IV

4. a) Define n-type and p-type extrinsic Silicon semiconductors.
- b) What is the difference between a solar cell and a photo-diode.
- c) Explain the operation of zener diode in the forward and reverse biased condition.
- d) What is Hall-effect? Obtain an expression for the Hall voltage. Name the applications of Hall effect.

OR

Write short notes on Type I and Type II superconductors.

Unit - V

5. a) Write any two characteristics of laser.
- b) Calculate the numerical aperture and maximum acceptance angle of an optical fiber from the following data $\mu_1 = 1.55$ and $\mu_2 = 1.50$
- What are the values of (N.A.) and max acceptance angle when the fiber is kept in water ($\mu_w = 1.33$)?
- c) Discuss the applications of optical fiber.