Paper Code: OE-033	Roll No.

B.Tech

(SEM III) ODD SEMESTER EXAMINATIONS 2015-16
LASER SYSTEMS AND APPLICATIONS

Time: 3 hours Total Marks:100

Note: Attempt all questions. All questions carry equal marks.

1. Answer any two parts of the following: (10 x 2 = 20)

    a) Starting from De-broglie wave concept obtain Heisenberg's uncertainity principle. Give the illustration of this principle.
    b) Develop the time-independent Schrodinger wave equation. What are the conditions that must be satisfied by the solution of the above wave equation.
    c) An electron is bouned by a potential which closely approaches in infinite square well of width 2.5×10^{-9} m. calculate three lowest permissible energy states.

2. Answer any two parts of the following: (10 x 2 = 20)

    a) What are Einstein's coefficients A and B? Derive Einstein's relation between them.
    b) Define the gain of a laser. Mention the different factors responsible for the decrease of the gain.
    c) Explain different types of optical resonators. What role does it play in laser.

3. Answer any two parts of the following: (10 x 2 = 20)

    a) Explain the various principles used in describing laser action.
    b) Describe the principle and working of CW laser. Give an example of He-Ne laser.
    c) What are different methods by which Q-switch can be incorporated in a laser.

4. Answer any two parts of the following: (10 x 2 = 20)

    a) What are Neodymium laser? Explain construction and working of Nd-YAG laser.
    b) What are Excimer laser? Describe its properties and applications.
    c) Describe short pulse generation and measurements giving one example of a practical device.

5. Answer any two parts of the following: (10 x 2 = 20)

    a) Explain the laser application in medicine and surgery? Discuss laser in ophthalmology.
    b) What is LIDAR technology? How it is different from a microwave RADAR.
    c) What is Holography? How laser is important in construction and reconstruction of image.