Printed Pages : 2

EOE-033

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 199310

Roll No.

# B. Tech.

## (SEM. III) (ODD SEM.) THEORY EXAMINATION, 2014-15

## LASER SYSTEM AND APPLICATIONS

Time : 3 Hours] [Total Marks : 100

**Note:** (1) Attempt all questions.
(2) All questions carry equal marks.

**1.** Answer any two parts of the following : **10×2=20**

(a) Describe the DeBroglie theory of matter waves. How it is experimentally verified?

(b) Establish time dependent Schrodinger wave equation. What do you mean by eigen value and eigen function?

(c) Find the intensity of a laser beam of 20 mW power and having a diameter of 1.3 mm. Assume uniform intensity across the beam.

**2.** Answer any two parts of the following: **10×2=20**

(a) What do you mean by coherence time and coherence length? Laser beam has a band width of 2500Hz. What are the values of coherence time and coherence length?

(b) What do you understand by pumping? Discuss different type of pumping scheme. How can it help in obtaining population inversion?



(c) What are resonators? Describe working of different types of resonators.

**3.** Answer any two parts of the following: **10×2=20**

(a) What do you understand by laser gain? Derive an expression for the loop gain.

(b) What are main components of laser? Discuss their necessity in laser action.

(c) What are continuous pulse lasers? Discuss the construction and working of He-Ne laser.

**4.** Answer any two parts of the following: **10×2=20**

(a) Describe the working of semiconductor laser.Discuss recombination radiation in order to explain the principle of operation of LEDs.

(b) What are excimer laser. Discuss its properties and applications.

(c) What are Q- switched laser. Discuss different methods by which Q-switch can be incorporated.

**5.** Answer any two parts of the following: **10×2=20**

(a) Explain the application of laser in medical science.

(b) How laser is important for material processing? Discuss in detail.

(c) Explain the importance of laser in holography technique. How the construction and reconstruction of image takes place in holography.

---