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

PAPER ID : 0929 Roll No. 1 2 3 5 1 3 1 0 3 5

B.Tech.

(SEM. III) ODD SEMESTER THEORY EXAMINATION 2013-14

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 : **(10×2=20)**

   (a) Discuss the dual nature of radiation and derive the de-Broglie wavelength of a particle as function of temperature.

   (b) Explain modified and unmodified radiations in Compton Effect. A beam of gamma radiation having photon energy 510 keV is incident on an aluminum foil. Calculate the wavelength of scattered radiation at 90°.

   (c) What is the importance of Schrodinger wave equation ? Derive time independent Schrodinger wave equation.

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

(a) Define and explain different types of coherence with the help of suitable diagram. Laser beam has a bandwidth of 2500 Hz. Calculate the coherence length and coherence time.

(b) Describe different types of pumping to achieve population inversion.

(c) Discuss the working principle of different types of resonators in laser system.

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

(a) What are main components of a laser ? Explain the principle involved for laser action.

(b) Discuss the construction and working of He-Ne laser with neat diagram. Why it is superior to Ruby Laser ?

(c) What do you mean by Q switching ? Describe two methods of Q switching.

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

(a) Describe generation and measurements of short laser pulses.

(b) What are Excimer Lasers ? Explain the construction, working and applications of excimer laser.

(c) What are Semiconductor Lasers ? Discuss the principle and applications of semiconductor diode laser.

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

(a) Discuss the importance of laser in material processing.

(b) Explain the working principle of Optical Communication. Why laser is important for optical communication ?

(c) Explain :

(i) Holography

(ii) LIDAR.