

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

PAPER ID : 0929 Roll No.

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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.