

Printed Pages : 3

EOE033

(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 2009-10  
LASER SYSTEM AND APPLICATIONS

Time : 3 Hours]

[Total Marks : 100

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

- 1 Attempt any **two** questions : **10×2=20**
- (a) Discuss on quantum physics briefly. Explain Schrodinger equation and deduce.
- (b) Explain spontaneous emission and stimulated emission. Describe coherent absorption.
- (c) Describe the following terms :
- (i) population inversion
- (ii) pumping
- (iii) gain of laser.
- 2 Attempt any **two** questions : **10×2=20**
- (a) What are optical cavities and pumping techniques ? Explain different types of pumping techniques in different types of lasers.

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[Contd...

- (b) Explain principle, construction and working of Fabry-Perot resonator. Derive the relation between Einstein's coefficients.
- (c) An optical source is selected from a batch characterized as having lifetimes which follow a slow internal degradation mode. The -3dB mean time to failure of these devices at room temperature is specified as  $5 \times 10^4$  h. If the device emits 1mW at room temperature, what is expected optical output power after 1 month of operation ? After 1 year ? After 5 years ?

3 Attempt any **two** questions : **10×2=20**

- (a) Give the principle, construction and working of Laser and describe types of lasers.
- (b) Describe the principle and working of CW laser.
- (c) Explain Atomic, ionic and molecular lasers and systems.

4 Attempt any **two** questions : **10×2=20**

- (a) Explain the working and principle of liquid and solid state lasers.
- (b) Describe short pulse generation and measurements giving one example of a practical device.
- (c) Explain three level to four level lasers.



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5×20=100  
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- (a) Excimer Lasers
- (b) LIDAR
- (c) Optical Modulation
- (d) Optical gain
- (e) Holography
- (f) Optical Communication
- (g) Medical Applications of Lasers
- (h) Laser application in Materials Processing.