



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

PAPER ID : 199325

Roll No.

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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.

- Answer any **two** parts of the following: **10x2=20**
 - Discuss the de-Broglie wave particle duality. Explain how it is helpful to explain the Bohr quantization rules.
 - Establish time dependent Schrodinger wave equation. What do you mean by eigen value and eigen function?
 - What are Einstein coefficients? Calculate the population ratio of two states in He-Ne laser that produces light of wavelength 6000 \AA at 300 K.
- Answer any **two** parts of the following. **10x2=20**
 - What do you mean by coherence? Explain temporal coherence. How temporal coherence related with coherence length.
 - What do you understand by pumping? Discuss different type of pumping scheme. How can it help in obtaining population inversion?

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

3. Answer any **two** parts of the following: **10x2=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) Explain the concept of three and four level lasers. Discuss the construction and working of Ruby laser.

4. Answer any **two** parts of the following: **10x2=20**

(a) Explain the construction and working of a dye laser. Also write advantages and disadvantages of dye lasers.

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

(c) Describe the short pulse generation and measurements giving one example of a practical device.

5. Answer any **two** parts of the following: **10x2=20**

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

(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 images takes place in holography.