



(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.

1. Answer any **two** parts of the following: 10x2=20
 - (a) Discuss the de-Broglie wave particle duality. Explain how it is helpful to explain the Bohr quantization rules.
 - (b) Establish time dependent Schrodinger wave equation. What do you mean by eigen value and eigen function?
 - (c) 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.

2. Answer any **two** parts of the following. 10x2=20
 - (a) What do you mean by coherence? Explain temporal coherence. How temporal coherence related with 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 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 image takes place in holography.
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