

No. of Printed Pages : 03

Roll No. ....

**W-786**

**B. Tech. EXAMINATION, Dec. 2017**

(Seventh Semester)

(Weekend) (Re-appear Only)

Phy-W-453

LASER TECHNOLOGY

(COMMON FOR ALL BRANCHES)

*Time : 3 Hours*]

[*Maximum Marks : 100*

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Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

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**Note :** Attempt any *Five* questions. All questions carry equal marks.

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**P.T.O.**

1. (a) Explain the following : **10**
  - (i) Absorption
  - (ii) Spontaneous Emission
  - (iii) Stimulated Emission.
- (b) What do you mean by population inversion ? How is it achieved ? **5**
- (c) Explain characteristics of laser. **5**
2. What do you mean by two level, three level and four level laser system ? Why two level laser is not appropriate for laser production ? What is the importance of metastable state ? **20**
3. (a) What do you mean by coherence of laser beam ? Distinguish between temporal and spatial coherence in laser emission. **10**
- (b) What are Einstein's coefficients ? Drive relation between them. **10**
4. (a) Explain the pumping process used in Laser. How many types of pumping processes are employed while achieving population inversion ? **10**

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- (b) Discuss various specific excitation parameters associated with optical and particle pumping. **10**
5. (a) Write short notes on the following : **10**
  - (i) Laser amplifiers
  - (ii) Factors affecting population inversion in Lasers.
- (b) How does a semiconductor laser differ from other lasers ? Give distribution of the semiconductor diode laser along with its applications. **10**
6. What do you understand by solid state lasers ? Explain construction, principle and working of Ruby Laser. **20**
7. With a neat diagram. Explain the construction, principle and working of He-Ne Laser. **20**
8. (a) Discuss construction, principle and working of CO<sub>2</sub> Laser. **15**
- (b) Discuss the various applications of Laser. **5**

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