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Total No. of Pages : 02

Total No. of Questions : 09

M.Sc.(Physics) (2015 to 2017) (Sem.-2)
OPTOELECTRONICS, LASERS AND ITS APPLICATIONS
Subject Code : MPH-202
M.Code : 71682

Time : 3 Hrs.

Max. Marks : 100

INSTRUCTION TO CANDIDATES :

1. Attempt any FIVE questions including the compulsory question no. 9.
2. Each question carries TWENTY marks.

- Q1. (a) What is the working principle of photodiodes? Explain the working of photodiodes in detail. (10)
- (b) What is the difference between LED and LCD? Explain the working of LED in detail. (10)
- Q2. (a) What is normalized frequency? Explain the significance of normalized frequency and derive the expression for number of guided modes in graded-index fiber. (10)
- (b) What do you mean by numerical aperture and acceptance angle of optical fiber? Derive the expression of numerical aperture in terms of acceptance angle of optical fiber. (10)
- Q3. (a) What is stimulated emission? Derive the Einstein's coefficients describing the probabilities of stimulated absorption and stimulated emission. (10)
- (b) What is population inversion? Derive the laser rate equation for three level laser. (10)
- Q4. (a) Explain temporal and spatial coherence. Also discuss the focusing properties of laser radiation. (10)
- (b) Discuss in detail Q-switching and mode locking in lasers. (10)
- Q5. (a) Discuss the construction, working and energy level diagram of Ruby laser. (10)
- (b) What do you mean by doped insulator laser? Discuss in detail Nd:YAG laser. (10)
- Q6. (a) Why gas lasers are highly monochromatic in nature? Discuss in detail He-Ne laser. (10)
- (b) What is the basic principle and characteristics of laser? Discuss in detail Nd: Glass laser. (10)

- Q7. (a) What is the basic principle used for the measurement of distance using interferometric methods? Discuss in detail pulse echo techniques. (10)
- (b) What do you mean by holography? Discuss different applications of holography. (10)
- Q8. (a) Discuss in detail about holographic interferometry. (10)
- (b) What do you mean by laser-induced fusion? Discuss the procedure of information storage using laser. (10)
- Q9. (a) Write a short note on seven segment display.
- (b) What is the working principle of optical fiber?
- (c) What do you mean by population inversion?
- (d) What is the importance of optical resonator in the laser?
- (e) What is the active material in carbon dioxide laser?
- (f) What is the role of He in He-Ne laser?
- (g) Write a short note on laser tracing.
- (h) What do you mean by resistor trimming? (8×2.5=20)

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.