

A

Reg. No. :

| | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|
| | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|

Question Paper Code: 59505

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2018

Elective

Electronics and Instrumentation Engineering

15UEI905 - OPTICAL AND LASER INSTRUMENTATION

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

PART A - (10 x 1 = 10 Marks)

1. In a laser structure, the existence of standing waves is possible at frequencies for which the distance between the mirrors is an integral number of _____ CO1 -R
(a) $\lambda / 2$ (b) $\lambda / 4$ (c) $\lambda / 6$ (d) $\lambda / 8$
2. Which among the following is regarded as an inelastic scattering of a photon? CO1 -R
(a) Kerr Effect (b) Raman Effect (c) Hall Effect (d) Miller Effect
3. _____ welding is done using pulse lasers or continuous wave laser beams with shutters. CO2- R
(a) Micro (b) Macro (c) Seam (d) Ultrasonic
4. Laser _____ is the controlled alteration of the attributes of a capacitor or a resistor by a laser action. CO2- R
(a) Heating (b) Melting (c) Trimming (d) Welding
5. A fiber which is referred as non-dispersive shifted fiber is CO3- R
(a) Coaxial cables (b) Standard single mode fibers
(c) Standard multimode fibers (d) Non zero dispersion shifted fibers
6. _____ is used to reduce the amount of blood supply to a tumor by blocking the flow of blood in selected arteries during laser surgery. CO3-R
(a) Embolization (b) Endoscopy
(c) Stereotactic surgery (d) Photo dynamic surgery

7. Dispersion in fibre optics refers to CO4- R
 (a) Loss of intensity (b) Broadening of light waves
 (c) Mixing of light waves (d) none of the above
8. In pyroelectric photo detectors, the consequent increase in dielectric constant due to temperature variation by the photon absorption, is generally measured as change in CO4- R
 (a) resistance (b) inductance (c) admittance (d) capacitance
9. Solar cell works based on CO5- R
 (a) Laser technology (b) Photo-conduction (c) Thermal emission (d) Tyndall effect
10. How many domains support the measurements of fiber dispersion? CO5- R
 (a) one (b) Three (c) Two (d) Four

PART – B (5 x 2= 10Marks)

11. How will you increase the modulation bandwidth of laser diode? CO1- R
12. What is LIDAR? CO2- R
13. What are the different ways in which Laser interacts with tissues in laser surgery? CO3- R
14. Define V number of fiber. CO4- R
15. List the two modes of laser melting process. CO5- R

PART – C (5 x 16= 80Marks)

16. (a) Describe the construction and working of Liquid laser with neat diagram. CO1- App (16)
 Or
 (b) Illustrate the principle and working of three level and four level laser with neat diagram. CO1 -App (16)
17. (a) Describe in detail the principle of laser welding and melting. CO2- App (16)
 Or
 (b) Explain in detail how Laser is used for the measurement of distance, length, Velocity and Acceleration. CO2 -Ana (16)
18. (a) Explain how 3D dimensional image is constructed and reconstructed with holography. CO3- Ana (16)

Or

- (b) Explain in detail about laser in plastic surgery and oncology. CO3 -Ana (16)
19. (a) Illustrate Absorption and Scattering losses and its measurement technique with neat sketch. CO4 -U (16)
- Or
- (b) What is meant by splicing? With neat diagram explain the different splicing technique. CO4 -Ana (16)
20. (a) Write the need for fiber optic sensors and explain in detail about any two extrinsic fiber optic sensors. CO5 -U (16)
- Or
- (b) Describe in detail about measurement of pressure and temperature using fiber optic sensor. CO5- U (16)

