

Reg. No. :

--	--	--	--	--	--	--	--	--	--

Question Paper Code: 41581

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2017

Elective

Electronics and Instrumentation Engineering

14UEI906 - LASER AND FIBER OPTICS INSTRUMENTATION

(Regulation 2014)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

- _____ is the major factor that decrease the life time of laser diode.
(a) low current density (b) aging
(c) threshold voltage (d) decrease of temperature
- The required properties of photo detector are
(a) high dark current (b) low dark current
(c) high dark voltage (d) low dark voltage
- _____ is the mechanism used to increase the amount of material removal.
(a) flushing of solid material (b) flushing of mass material
(c) flushing of vapour material (d) flushing of liquid material
- Measurement to the velocity of the fluid can be made by _____ effect.
(a) laser cutting (b) laser welding
(c) laser doppler (d) hardening
- _____ is the process of three dimensional image construction by recording and reconstruction of interference techniques without the aid of lenses.
(a) holography (b) photographic film
(c) argon ion laser (d) endoscopes

6. Photo thermal processes are used to _____ of tissues.
- (a) decrease the temperature (b) increase the temperature
(c) increase the pressure (d) decrease the pressure
7. _____ are the rays following zig zag path when they travel through fiber and for every reflection it will across the fibre.
- (a) skew rays (b) refractive rays
(c) optical fibres (d) meridional rays
8. _____ is a medium for carrying information from one point to another in the form of light.
- (a) fiber optics (b) critical angle
(c) angle of incidence (d) angle of reflection
9. _____ are complex semiconductors that convert an electrical current into light.
- (a) laser diodes (b) fiber optic
(c) pockels effect (d) kerr effect
10. _____ is a phenomenon peculiar to transverse waves.
- (a) inter ferometric sensors (b) fiber optic polarimeter
(c) polarization (d) micro bending sensor

PART - B (5 x 2 = 10 Marks)

11. What is gas laser?
12. What is laser welding?
13. What are the uses of holography?
14. What is the necessity of cladding for an optical fiber?
15. What is fiber optic gyroscope?

PART - C (5 x 16 = 80 Marks)

16. (a) Explain the basic characteristics of lasers. Derive an expression for threshold gain for laser. (16)

Or

- (b) Explain the working principle of solid lasers with neat sketch. (16)

17. (a) Explain the principle of laser for the measurement of distance and velocity with neat sketch. (16)

Or

(b) Explain the application of laser in melting and trimming of materials. (16)

18. (a) Explain in detail the principles of holographic interferometry and its application. (16)

Or

(b) Write short note on the following related to holography application:

(i) Removal of tumors of vocal cords (8)

(ii) Brain surgery (8)

19. (a) Describe the different types of fibers and their properties with neat sketch. (16)

Or

(b) Enumerate and explain the requirements for an optical source and an optical detector. (16)

20. (a) Explain the working principle of different types of modulators with neat sketches. (16)

Or

(b) Explain the working principle of fiber optic liquid level measurement. (16)
