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**Reg. No. :**

**Question Paper Code: 49063**

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

Elective

Instrumentation and Control Engineering

14UIC909- FIBER OPTICS AND LASER INSTRUMENTS

(Regulation 2014)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. If a light travel in a certain medium and it gets reflected off an optically denser medium

with high refractive index, then it is regarded as \_\_\_\_\_\_\_

(a) External Reflection (b) Internal Reflection

(c) Both a and b (d) None of the above

2. The angle at which the light departs from the surface is called \_\_\_\_\_\_\_

(a) Angle of incidence (b) Angle of reflection

(c) Critical angle (d) Refracted ray

3. The threshold current of laser is \_\_\_\_\_\_\_\_\_\_\_

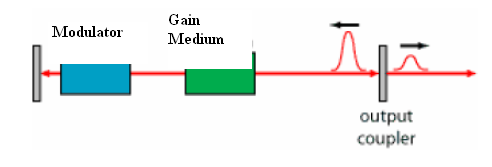
(a) 5 to 100 (b) 5 to 40 (c) 8 to 50 (d) 6 to 40

4. In Kerr effect, induced index change has its proportionality with respect to\_\_\_\_\_\_\_\_\_

(a) Square of electric field (b)Cube of electric field

(c) Cube root of electric field (d) One-fourth power of electric field

5. Identify the type of mode locking\_\_\_\_\_\_\_\_\_



(a) Passive (b) Active (c) Coherent (d) Linear

6. Which of the following is an example of optical pumping\_\_\_\_\_\_\_\_\_\_\_\_

(a)Ruby Laser (b) Helium Neon (c) Semiconductor (d)Dye laser

7. In OTDR response the peaks of the reflected waveform do not occur due to\_\_\_\_\_\_\_

(a)Reflection from the end of the fibre (b) Reflection from a connector

(c)Backscatter (d)Reflection from the interface of core and cladding

8. Which LIDAR Provides global coverage but at lower horizontal resolution\_\_\_\_\_\_\_

(a) Ground Borne (b)Satellite Borne (c)base Borne (d)Horizontal Borne

9. Expansions for PDT is\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(a)Photo Dynamic Therapy (b) Photo Detect Therapy

(c)Picture dynamic therapy (d) Picture Detect Therapy

10. Oncology is the study and treatment of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(a) Cancer(b)EYE (c)Blood (d)Nerves

PART - B (5 x 2 = 10 Marks)

11. Define total internal reflection?

12. Differentiate extrinsic and intrinsic sensors*.*

13. List the special characteristics of laser light?

14. State the types of welding and list how it’s being done?

15. Define holography.

PART - C (5 x 16 = 80 Marks)

16. (a) (i) Explain the Principle of light propagation through fiber with neat diagram. (8)

(ii) Illustrate the types of fibers and their properties. (8)

Or

(b) Describe the construction and working of any two optical sources with neat diagram*.*

(16)

17. (a) Explain the principle of different optical modulators. (16)

Or

(b) Write Short notes on the use of measurement using fiber optic sensors in an

industry. (16)

18. (a) The laser is a three-level laser and the pumping source is flash tube. Identify the type

of laser and explain its construction and its application. (16)

Or

(b) Explain the operation of Q switching, mode locking and cavity damping in lasers.(8)

19. (a) Explain how laser is used for measuring distance and length? (16)

Or

(b) Discuss how laser is used in material processing and explain laser heating process and laser trimming of material. (16)

20. (a) Define Holography and explain recording and reconstruction of a hologram. (16)

Or

(b) Explain the various types of the laser interaction with tissue. What are the

Precautions to be considered for the laser surgery? (16)