Question Paper Code: 39506

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2020

Elective

Electronics and Instrumentation Engineering

01UEI906 - LASER AND FIBRE OPTICS INSTRUMENTATION

(Regulation 2013)

Duration: 1.15 hrs   Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

1. Internal Quantum efficiency of a laser is

    (a) $\eta = 2\,\tau\,/\,\tau_r$ (b) $\eta = \tau_r\,/\,\tau$ (c) $\eta = \tau\,/\,\tau_r$ (d) $\eta = 3\,\tau\,/\,\tau_r$

2. When the laser output is coupled with fiber, some light will be reflected back into the laser clarity. This occurs at _____.

    (a) Fiber joints   (b) Reflection joints   (c) Index joints   (d) Non fiber joints

3. While measuring the velocity of the laser, the distance "S" between fringes is denoted by

    (a) $S = \dfrac{\lambda}{2\,\sin\theta}$ (b) $S = \dfrac{\lambda}{2\,\sin\dfrac{\theta}{2}}$ (c) $S = \dfrac{\lambda}{\sin\dfrac{\theta}{2}}$ (d) $S = \dfrac{\lambda}{\sin\theta}$

4. In conduction limited melting, the shape of the melted region is in the form of hemispherical and _____ (Where dE/dt is rte of laser energy incidence and dH/dt is rate of heat conduction).

    (a) $\dfrac{dE}{dt} < \; < \dfrac{dH}{dt}$ (b) $\dfrac{dE}{dt} > \dfrac{dH}{dt}$ (c) $\dfrac{dE}{dt} > \; > \dfrac{dH}{dt}$ (d) $\dfrac{dE}{dt} < \dfrac{dH}{dt}$

5. Which is used to store the testing data with 100 percent security?
    (a) Electrocardiography   (b) Electroretinography
    (c) Holography   (d) Electroengography

6. In medical applications, the unit used for laser treatment is

    (a) Milliwatt / cm^2 (b) Kilowatt / cm^2 (c) Megawatt / cm^2 (d) Nanowatt / cm^2

7. The cut-off wavelength of the fiber is

    (a) $\lambda_{cutoff} = \dfrac{\pi\, a\,(\text{N.A.})}{V}$ (b) $\lambda_{cutoff} = \dfrac{2\,\pi\, a\,(\text{N.A.})}{V}$

    (c) $\lambda_{cutoff} = \dfrac{3\pi\, a\,(\text{N.A.})}{V}$ (d) $\lambda_{cutoff} = \dfrac{4\,\pi\, a\,(\text{N.A.})}{V}$

8. The low splice loss is _____

    (a) < 0.06 dB   (b) $< = 0.06$ dB   (c) > 0.06 dB   (d) $> = 0.06$ dB

9. Faraday rotation is _____

    (a) $\theta_r = \mu_1\, \mu_r\, n\, V\, I$ (b) $\theta_r = \mu_0\, \mu_1\, n\, V\, I$

    (c) $\theta_r = \mu_2\, \mu_r\, n\, V\, I$ (d) $\theta_r = \mu_0\, \mu_r\, n\, V\, I$

10. _____ sensor consists of two fibers which are connected at the base of a glass micro prism in the total internal reflection process.

    (a) Solid level   (b) Gas level   (c) Liquid level   (d) Solid and liquid level

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PART – B (3 x 8= 24 Marks)

(Answer any three of the following questions)
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11.   What is resonator configuration? How it is achieved?   (8)

12.   Write notes on LASER heating and welding.   (8)

13.   Explain the three scientific applications of Holography.   (8)

14.   Explain the propagation of light through fiber. Also give the different types of fibers and their properties.   (8)

15.   With a neat diagram explain the working of fiber optic Instrumentation system.   (8)

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