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Total number of printed pages – 2

B. Tech
PEEE 5301 (New)

Sixth Semester (Back) Examination – 2013
OPTOELECTRONICS DEVICES AND INSTRUMENTATION

BRANCH : EEE, IEE

QUESTION CODE : B304

Full Marks – 70

Time : 3 Hours

Answer Question No. 1 which is compulsory and any **five** from the rest.
The figures in the right-hand margin indicate marks.

1. Answer the following questions : 2×10
- Write few optical phenomena which can be described by Particle properties of light.
 - What is Diffraction of light ?
 - Distinguish between circularly polarized light and elliptically polarized light.
 - Define Numerical Aperture.
 - Write the function of Splicer in optoelectronics.
 - Why optical feedback is used in Laser sources ? Is it a positive feedback or a negative feedback ?
 - Why Laser is a suitable candidate as a signal in optoelectronics instrumentation ?
 - What is interference of light ?
 - What is the role of modulation techniques in instrumentation ?
 - Write few advantages of optical instrumentation comparing to electronic instrumentation.
2. (a) Write mathematical expression and propagation of Electric and Magnetic vector in free space and in a medium in z-direction. 5
- (b) With simple ray diagram, describe transmission of light through slab and cylindrical wave guides. 5



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3. (a) Define V-number and describe propagation of Ray in a single mode and multi-mode fibres. 5
- (b) Explain the phenomena of dispersion of light in step index and graded index fibres. 5
4. (a) With suitable diagram describe operation of a polarizer. Use ray diagram, if necessary. 5
- (b) Briefly describe construction and principle of operation of LEDs. 5
5. (a) Describe principle of operation of Gas and Semiconductor Lasers. 5
- (b) Briefly describe operation of PN, PIN and APD Photo diodes. Write few advantages and disadvantages. 5
6. (a) State "Electro-Optic" effect. Hence describe how voltage or current can be measured using this principle. 5
- (b) With suitable diagram, explain principle of measurement of displacement. 5
7. (a) Describe construction and principle of operation of Optical Gyroscope. 5
- (b) Describe various types of distributed fibre optic sensors. 5
8. Write short notes on any **two** : 5×2
 - (a) Losses in Optical Fibre
 - (b) Pulsed and continuous type Laser
 - (c) Modulation techniques based on intensity.

