

Registration No. :

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Total number of printed pages – 2

B. Tech
PEEE 5301

Sixth Semester Regular Examination – 2014
OPTOELECTRONICS DEVICES AND INSTRUMENTATION
BRANCH(S) : AEIE, EEE, EIE, IEE
QUESTION CODE : F 301

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
 - (a) List a few optical phenomena that can be explained by Wave Property of Light.
 - (b) Write the mathematical expression of the electric field of a linearly polarized plane light wave propagating in the +z direction.
 - (c) What is the importance of Brewster Angle ?
 - (d) Write few advantages of Graded Index Fiber comparing to Step Index Fiber.
 - (e) Write few properties of LASER.
 - (f) List various Polarizers used in optical instrumentation.
 - (g) List a few materials used for making semiconductor LASER.
 - (h) What is meant by Modulation in Optical Instrumentation ?
 - (i) State Electro-Optic effect of light.
 - (j) Define "Candela".
2.
 - (a) Explain the phenomena of two beam interference of light. How bright and dark fringes are produced during interference of light ? 5
 - (b) Briefly explain "Diffraction" of light. How is it different from "Scattering" of light ? 5

P.T.O.

3. (a) Describe various "modes" used in Optical Fiber. What is the importance of V-number ? 5
(b) Briefly explain various types of losses observed in optical fiber instrumentation. 5
4. (a) Describe construction and principle of operation of LED. 5
(b) Describe fundamental principle of LASER emission. Explain Population Inversion and Conditions for Oscillation. 5
5. (a) Describe construction and principle of operation of Gas LASER. 5
(b) Briefly describe the characteristics and principle of operation of PIN and APD photodiodes. 5
6. (a) With suitable diagram, describe Intensity Modulation techniques used in optoelectronics instrumentation. 5
(b) With suitable diagram, describe principle of operation of Mach-Zehnder Interferometer. 5
7. (a) Briefly describe principle of Pressure and Flow measurement using optoelectronic instrumentation. 5
(b) Briefly describe principle of Current and Voltage measurement using optoelectronic instrumentation. 5
8. Write short notes on any **two** of the following : 5×2
(a) Transmission of light through Slab and Cylindrical wave guides
(b) Principle of emission of Pulsed and Continuous type LASER
(c) Distributed Fiber Optic Sensors – OTDR and OFDR.

