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BIELE-008

B.Tech. – VIEP – ELECTRONICS AND COMMUNICATION ENGINEERING (BTECVI)

Term-End Examination

00636 **June, 2016**

BIELE-008 : OPTO ELECTRONICS COMMUNICATION SYSTEMS

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any **seven** questions. All questions carry equal marks. Missing data, if any, may be suitably assumed. Use of scientific calculator is permitted.*

1. Briefly explain the different attenuation mechanisms in optical fibers. *10*

2. (a) Define the following terms related to optical fibers : *5*

(i) Cone of Acceptance

(ii) Acceptance Angle

(b) Compare dispersion shifted and dispersion flattened fibers. *5*

3. Explain the following terms : *2×5=10*

   (a) Self-phase modulation

   (b) Concept of V-number

4. (a) Define the following terms related to optical fibers : *5*

      (i) Absorption Losses

      (ii) Scattering Losses

   (b) An LED with spectral width of 17 nm is used as an optical source. Determine the material dispersion in optical fiber of length 20 km, if pulse spreading rate at the output is 1·76 ns/km. *5*

5. Discuss the following terms related to optical source Light-Emitting Diode (LED) : *3+4+3=10*

   (a) Excitation process

   (b) Recombination process

   (c) Photon-extraction process

6. With the help of a neatly labelled diagram, explain the operating principle of a Laser Diode. *10*

7. Derive expressions for the following parameters for a PN Detector : *4+6=10*

   (a) Quantum Efficiency

   (b) Responsivity and Sensitivity

8. With the help of a Laser Diode structure, briefly explain its switching and modulation characteristics. *5+5=10*

9. Explain the amplification process in optical fibers using semi-conductor amplifier. *10*

10. Write short notes on any ***two*** of the following : *2×5=10*

    (a) Brillouin Amplifier

    (b) Intermodulation Effects

    (c) Saturation Induced Crosstalk