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BIELE-008

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

00706

Term-End Examination

June, 2015

BIELE-008 : OPTO ELECTRONICS COMMUNICATION SYSTEMS

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any **seven** questions. All questions carry equal marks.*

1. Discuss the basic optical laws and define the terms relating to optical fibre communication. Also give the basic structure of an optical fibre cable. *10*

2. (a) Define single-mode and multi-mode optical fibre. *5*

(b) Define 'Numerical aperture' and 'Acceptance angle' of a fibre. *5*

3. (a) Define 'Step-Index' fibre and 'Graded-Index' fibre. *5*

(b) Calculate the refractive index of the core and the cladding materials of an optical fibre for which Numerical Aperture (NA) = 0·35 and Δ = 0·01. *5*

4. (a) Define radiative losses and 'core and cladding' losses of an optical fibre. *5*

(b) Calculate the loss of an optical fibre in dB/km whose length is 100 m and is fed with an optical power of 10 μW and the output power is 7·5 μW. *5*

5. Briefly discuss the primary optical sources. Explain the three basic processes involved in the operation of LED. *10*

6. (a) What is the need of LASER diode ? Briefy discuss its operating principle. *5*

(b) Enlist the comparison between LED and LASER diode. *5*

7. (a) Name three optical detectors. Also discuss the characteristics of photodiodes. *5*

(b) List the advantages, disadvantages and applications of Avalanche Photo-detector. *5*

8. Discuss the following terms associated with photo-detectors : $4 \times 2\frac{1}{2} = 10$

(a) Responsivity

(b) Quantum efficiency

(c) Dark current

(d) Detectivity

9. Explain the digital receiver performance calculation based on bit error rate. *10*