No. of Printed Pages : 3

BIELE-008

B.TECH. IN ELECTRONICS AND COMMUNICATION ENGINEERING (BTECVI)

Term-End Examination

December, 2012

BIELE-008 : OPTO ELECTRONICS COMMUNICATION SYSTEMS

Time : 3 hours *Maximum Marks : 70*

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

1. (a) Describe the advantages of optical communication over the electronics communication. **2x5=10**

(b) Explain the structure of optical fiber with suitable diagram.

2. (a) What is modal birefringence ? **2x5=10**

(b) Two polarization maintaining fibers operating at a wavelength of 1.3 μm have beat lengths of 0.7 mm and 80 m. Determine the modal birefringence in each case and comment on the results.

3. (a) Classify the optical fiber on the basis of mode. **2x5=10**

(b) Discuss the significance of V number.

4. (a) Discuss the factors responsible for attenuation in optical fiber. 2x5=10

(b) A multimode graded index fiber exhibits total pulse broadening of 0.1μs over a distance of 15 km. Determine the band width length product of the fiber.

5. Explain what is meant by self phase modulation. Identify and discuss a major application area for this nonlinear phenomenon. 10

6. Explain with the help of suitable diagrams the mechanism giving the emission of light from a LED. Discuss the effects of this mechanism on the properties of the LED. 10

7. Describe the common LED structures for optical fiber communication. Discussing their relative merits and drawbacks. In particular, compare surface and edge - emitting devices. 10

8. (a) Describe the quantum efficiency and responsibility of an optical detector. 2x5=10

(b) A p - n photodiode has a quantum efficiency of 50% at a wavelength of 0.9 μm. Determine its responsivity at 0.9 μm.

9. (a) Explain an optical receiver, considering the various sources of noise. **2x5=10**

(b) Discuss the major reasons which have led to the development of optical amplifiers.

10. Write short notes on ***any two*** of the following : **2x5=10**

(a) Raman amplifier

(b) PN detector

(c) Graded index fibers.