

(3 Hours)

[ Total Marks : 100

- N.B. : (1) Question no. 1 is compulsory  
(2) Attempt any four questions from the remaining six questions.  
(3) All questions carry equal marks.  
(4) Assume suitable data if necessary and justify the same.

1. (a) Explain the three operating windows in optical communication. 5  
(b) What are direct and indirect bandgap semiconductor materials. 5  
(c) What is the significance of 'V' numbers. Write its equation in terms of N.A. (Numerical Apertur). 5  
(d) Explain bandwidth distance product. 5
2. (a) Draw refractive index profile of graded index fiber. Explain how GRIN fiber has transmission bit rate higher than multimode step index fiber. 10  
(b) A silica optical fiber with one diameter large enough to be considered by ray theory has core refractive index of 1.5 and cladding refractive index of 1.47. Determine. 10  
(i) The critical angle.  
(ii) The N.A.  
(iii) The acceptance angle.
3. (a) Explain any one fiber fabrication process with neat sketches. 10  
(d) What are the factors that are responsible for optical signal attenuation and dispersion during signal propagation through optical fiber. 10
4. (a) Explain all aspects of link power budget and rise time budget 10  
(b) Give the structure of a surface emitting LED. Compare it with Edge emitting LED. 10
5. (a) Describe two methods of splicing individual fibers together. What are the advantages and disadvantages of each method? 10  
(b) Discuss the operation of silicon RAPD. How it is different from PIN photodiode? 10
6. (a) Explain the working of optical receiver with various noise sources. 10  
(b) A photodiode has a quantum efficiency of 65% when a photon of energy of  $1.5 \times 10^{-19}$  J are incident upon it determine. 10  
(i) At which wavelength is the photodiode operating  
(ii) Calculate the incident optical power required to obtain photocurrent of 2.5  $\mu$ A when the photodiode operating as above.
7. Write short note on any four 20  
(a) OTDR. (b) Coherent and non-coherent optical transmission.  
(c) Linearly polarized modes. (d) Multiplexing of optical signals.  
(e) Modal noise.

Course: B.E. (SEM.-VIII)(REV. -2007)(E&TC ENGG.)(Prog T4918)

QP Code: 2791

Correction:

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Q.no. 6(b)

Read As:

A photodiode has a .....energy of  $1.5 \times 10^{-19} \text{J}$ .....it determine.

Instead of:

A photodiode has a .....energy of  $1.5 \times 10^{-10} \text{J}$ .....it determine.

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