2485

DFI1349

Fiber Optic Communication
(New) (1220)

P. Pages : 2

Time : Three Hours

Max. Marks : 100

Instructions to Candidates :
1. Do not write anything on question paper except Seat No.
2. Answersheet should be written with blue ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. Solve **any two** sub-questions from each unit.
5. Figures to the right indicates full marks.
6. Use of non-programmable calculator is allowed.
7. Draw neat diagrams wherever necessary.
8. Assume suitable data if necessary.

UNIT - I

1. a) Explain Rayleigh scattering and mie scattering losses in detail. **10**

   b) Explain different types of fiber optic splices and connector. **10**

   c) A silica optical fiber with core diameter large enough to be consider by ray theory analysis has a core refractive index of 1.45 and cladding refractive index of 1.42. Determine.
   i) The critical angle at the core-cladding interface.
   ii) The N.A. for fiber.
   iii) Acceptance angle in air for fiber. **10**

UNIT - II

2. a) Explain principle of LASER in detail. Discuss Heterojunction LASER and strip-geometry LASER. **10**

   b) Explain avalance photodiode and quantum efficiency in detail. **10**

   c) A Germanium P-I-N photodiode with active diamentions of $150 \times 50 \mu m$ has a quantum efficiency of 60% when operating at wavelength of $1.2 \mu m$. The measured dark current is 7nA. Calculate the noise equivalent power and specific defectivity for device. Assume that dark current is dominant noise source. **10**

UNIT - III

3. **a)** Explain the principle of coherent detection for any optical receiver. Give difference between coherent detection and direct detection.   **10**

   b) Explain optical frequency Division multiplexing.   **10**

   c) Write short note on.   **10**

   i) Amplitude shift keying.

   ii) Frequency shift keying.

   iii) Phase shift keying.

UNIT - IV

4. **a)** Explain the measurement method for the refractive index in fiber optic communication.   **10**

   b) What is absorption, scattering and bending losses.   **10**

   c) A multimode graded index fiber give total pulse broadening of $0.2\mu s$ over a distance of 20 k.m. Calculate
   i) Maximum bandwidth.
   ii) Pulse dispersion per unit.
   iii) Band width distance product for fiber.   **10**

UNIT - V

5. **a)** Explain :   **10**
   i) SONET.
   ii) Integrated optics.

   b) Explain optical sensors and optical switches.   **10**

   c) Explain wavelength Division multiplexing and DWDM.   **10**

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