

Course: B. Tech. Branch: Electronics & Telecommunication Engineering

Subject Code & Name: BTETPE702D & Fiber Optic Communication Semester: VII

Max Marks: 60

Date: 18/08/2022

Duration: 3.45 Hr.

Instructions to the Students:

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in () in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

(Level/CO) Marks

Q.1 Solve Any Two of the following.

- A) Define the refractive index of a medium with the help of the ray diagram explain Snell's law for refraction and reflection. Level 2 6
- B) Derive the expression for the numerical aperture (NA) of the optical fiber. Level 3 6
- C) Calculate the numerical aperture of a step index fiber having $n_1 = 1.48$ and $n_2 = 1.46$. What is the acceptance angle θ_A for this fiber if the outer medium is air with $n = 1.00$? Level 2 6

Q.2 Solve Any Two of the following.

- A) Explain the dispersion mechanism in optical fibers. Level 1 6
- B) Explain the OTDR. Level 1 6
- C) What do you mean by the mode field diameter (MFD) of the single mode step index fiber? Write definition with suitable diagrams. Level 3 6

Q.3 Solve Any Two of the following.

- A) Explain the principal of LASER diode. What are the pumping techniques of LASER diode? Level 4 6
- B) What do you understand by optical detector? Discuss its various types of optical detector and parameters of photo detectors. Level 1 6
- C) What do you understand by the term external quantum efficiency and internal quantum efficiency? Level 2 6

Q.4 Solve Any Two of the following.

- A) Explain the concept of optical switch. Level 1 6
- B) For a fiber with core refractive index of 1.54 and fractional refractive index difference of 0.01. Calculate its numerical aperture. Level 2 6
- C) Explain the concept of WDM. Level 2 6

Q. 5 Solve Any Two of the following.

- A) Explain Raman amplifier. Level 1 **6**
- B) Explain the concept of self-phase modulation. Level 1 **6**
- C) Explain stimulated Raman scattering Level 1 **6**

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