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**B.TECH (ETE)(ECE)(Sem.-7<sup>th</sup>)**  
**OPTICAL COMMUNICATION**

Paper ID: [A3001]

**Max. Marks: 60**

- 1. Section-A is compulsory.**
- 2. Section-B Attempt any four questions.**
- 3. Section-C Attempt any two questions.**

### SECTION-A

(10x2=20)

- (a) What is the need of optical communication?
- (b) Define splicing.
- (c) Define modal noise.
- (d) Define the term sensitivity.
- (e) Define critical angle.
- (f) Define the term distortion factor.
- (g) Define mode-field diameter.
- (h) What is the operating wave length window for optical communication?
- (i) State the two analyses usually carried out to ensure the desired performance of optical fibre transmission link?
- (j) What is the main function of optical multiplexing?

### Section-B

**(4x5=20)**

**Q.2.** Differentiate the following: (a) step-index fiber and graded index fibre; (b) LED and LASER.

**Q.3.** Define Numerical Aperture. Derive the  $NA = n \sqrt{2\Delta}$ .

- Q.4. Explain the mechanism of optical feedback to provide oscillation and hence amplification within the LASER. Also define the term "population inversion" in connection with LASER?
- Q.5. Compare the PIN and APD photo detectors on the basis of their working, advantages, disadvantages and applications.
- Q.6. Calculate the core radius and cladding refractive index of a step-index silicon fibre having  $NA=0.3$ ,  $V=75$ ,  $n_1=1.5$  and it is to be operated at  $850\text{nm}$ .

Section-C

(2x10=20)

- Q.7. Define the term non-linear effects. Explain the various non-linear effects in optical fibre communication along with the ways of reducing them.
- Q.8. Explain the concept of WDM and also the key system features of WDM with the help of a suitable block diagram.
- Q.9. Explain the convenient budget analysis for determining the power limitation of an optical fibre link.

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