

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER– VI (OLD) EXAMINATION – WINTER 2021****Subject Code:161005****Date:26/11/2021****Subject Name:Optical Communication****Time:10:30 AM TO 01:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

- Q.1** (a) Using simple ray theory, describe the mechanism for the transmission of light within an optical fiber and show how acceptance angle is related to the fiber numerical aperture **07**
- (b) Describe briefly the degradation of signal in optical fiber. **07**
- Q.2** (a) Explain block diagram of optical communication system with neat sketch and mention functions of each block. **07**
- (b) Mention the advantages and applications of optical fiber communications. **07**
- OR**
- (b) A multimode step index fiber with a core diameter of 80 μm and a relative index difference of 1.5% is operating at a wavelength of 0.85 μm . If the core refractive index is 1.48, calculate: **07**
- (i) Normalized frequency of fiber
- (ii) Total number of guided modes.
- Q.3** (a) List the different types of lensing schemes used in optical system and explain. **07**
- (b) Discuss optical power loss model for a point to point link. **07**
- OR**
- Q.3** (a) Discuss the various dispersion mechanisms that contribute to pulse broadening during the fiber transmission. **07**
- (b) Explain (1) fusion splicing, (2) V-grove splicing and (3) elastic tube techniques for fiber splicing **07**
- Q.4** (a) (a) List the types of Light Emitting Diodes used in optical system and explain any one of them with required figure. **07**
- (b) Briefly explain the principal of optical detection. Discuss the major advantages of APD over P-i-n photodiode. **07**
- OR**
- Q.4** (a) Technically explain the term spontaneous emission and stimulated emission. **07**
- (b) Define the following terms related to photo detector. **07**
- (1) Responsivity (2) Quantum efficiency (3) Cut off wavelength
- Q.5** (a) What is meant by attenuation of signal in fiber cable? How this loss can be measured? **07**
- (b) Explain the basic principles of WDM and DWDM with respect to optical fiber system. **07**
- OR**
- Q.5** (a) Discuss the need of optical Amplifier and also describe the architecture and amplification mechanism of Erbium Doped Fiber Amplifier. (EDFA). **07**
- (b) Write short notes on Synchronous optical fiber networks (SONET) **07**
