

Roll No. ....

**24443**

**B. Tech 7th Sem. (ECE)  
Examination – May, 2018**

**OPTICAL COMMUNICATION**

**Paper : ECE - 415 - F**

Time : Three Hours ]

[ Maximum Marks : 100

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

*Note :* Attempt *five* questions in total. All questions carry equal marks. Question No. 1 is *compulsory*. Attempt *one* question from each unit.

1. (a) Difference between analog and digital optical fibre communication system.
- (b) Explain Critical bending radius of fibre.
- (c) What do you understand by splicing loss in fibre.
- (d) Explain responsivity.
- (e) Explain population inversion.  $5 \times 4 = 20$

## SECTION - A

2. (a) Draw the block diagram of Optical communication system and explain function of each block. 10
- (b) A silica optical fibre with a core refractive index 1.50 and a cladding refractive index of 1.47. Determine (i) Critical angle of core cladding interface (ii) NA for the fibre (iii) Acceptance angle in the air for the fibre. 10
3. (a) With the help of ray theory, Explain propagation of light in optical fibre. 10
- (b) Explain Evanescent field and Goos-Haenchen shift. 10

## SECTION - B

4. (a) What do you understand by attenuation ? Explain losses due to absorption in optical fibre cable in detail. 10
- (b) Discuss Linear scattering losses in optical fibre cable in detail. 10
5. (a) Discuss the types of optical fibre cable based on the propagation. 10
- (b) Discuss various types of couplers in detail. 10

### SECTION - C

6. Explain the basic principle of operation and construction of Laser. Also derive the equation for various type of efficiencies and how coupling efficiency can be improved when Laser is used as light source. 20
7. (a) Give out the characteristics of LED when used as light source in optical communication system. 10
- (b) Explain behaviour of LED at high frequencies. 10

### SECTION - D

8. (a) Explain working principles of PIN photo detector. Also give out its advantages and disadvantages. 10
- (b) What all factors should be kept in mind while selecting the semiconductor material for construction of photo detector ? Explain in detail. 10
9. Explain the following about APD : 6, 7, 7
- (a) Design.
- (b) Noise.
- (c) Bandwidth.
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