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Total Pages : 2

## 8713

### BT-7/DX

### OPTICAL COMMUNICATION

Paper : ECE-405(E)

Time : Three Hours]          [Maximum Marks : 100

**Note :** Attempt *five* questions in all, selecting at least *one* question from each unit.

## UNIT–I

1.  (a) Define critical angle for a dielectric interface and explain phenomenon of total internal reflection in a step index fibre.          10

    (b) What do you mean by Acceptance angle? Calculate acceptance angle for a step index fibre having core refractive index 1.475 and cladding refractive index 1.465.          10

2.  Solve the wave equation in a cylindrical waveguide (optical fibre) and find out how it is convenient to use normalized frequency parameter V to discuss propagation of various modes of a waveguide.          20

## UNIT–II

3.  (a) Discuss absorption mechanism near resonance frequency in a material and give cause of absorption peak near 1.4 μm.          10

    (b) What are the effects of bending in a fibre on strength of signals? Explain microbending in detail.          10

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4. (a) Give the origin of material dispersion in an optical fibre and discuss region of minimum material dispersion in it.

10

(b) Discuss waveguide dispersion and justify why this dispersion is vital for a single mode fibre geometry to allow maximum transmission rate.

10

## UNIT–III

5. (a) Define internal quantum efficiency in LEDs and discuss the four basic causes of optical loss in an LED, briefly.

10

(b) What is the pumping mechanism in a laser diode? Compare spectral characteristics of a laser diode and a LED.

10

6. (a) Define Responsivity of a photodetector and explain its importance. Why p-i-n photodiodes are widely used in communication?

10

(b) Give the block diagram of the transmitter in optical fibre communication system and explain working of its various components.

10

## UNIT–IV

7. (a) How light is coupled from source to fibre in an optical network? Discuss working of various couplers. 10

(b) Give a brief account of optical amplifiers and its use in optical communication network.

10

8. (a) Discuss an example of Wide area network in the form of several interconnects in form of multihop network formation.

10

(b) What do you mean by a Photonic network? Discuss it as a future communication network alternative. 10

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