

Code: EC7T1

**IV B.Tech - I Semester – Regular/Supplementary Examinations
MARCH - 2021**

**OPTICAL COMMUNICATIONS
(ELECTRONICS & COMMUNICATION ENGINEERING)**

Duration: 3 hours

Max. Marks: 70

PART – A

Answer *all* the questions. All questions carry equal marks

11 x 2 = 22

1.

- a) Define Numerical Aperture of the fiber.
- b) Differentiate Guided modes and Leaky modes.
- c) What are the different mechanisms for Absorption of light in fibers?
- d) What is Pulse broadening in fibers?
- e) Define the Internal quantum efficiency of LED.
- f) What is the response of the photodiode at lower wavelength?
- g) Define Stimulated emission in the case of LASER.
- h) List out the requirements of Photo detectors.
- i) Define Responsivity of Photodiode.
- j) What are the disadvantages of SONET?
- k) Define the Sensitivity of Optical Receiver.

PART – B

Answer any **THREE** questions. All questions carry equal marks.

$$3 \times 16 = 48$$

2. a) Calculate the numerical aperture of a plastic step-index fiber having refractive index of $n_1=1.6$ and a Cladding index $n_2=1.49$ 5 M
- b) Draw the Structure of step-index fiber and explain how optical ray can propagate in it? 5 M
- c) Explain how total internal reflection takes place in an Optical fiber with neat Sketches. 6 M
3. a) Briefly describe linear Scattering losses in Optical fibers with regard to
- i) Rayleigh scattering
 - ii) Mie Scattering 10 M
- b) Describe the mechanism of intermodal dispersion in a multimode step index fiber. 6 M
4. a) Discuss with the aid of suitable diagrams, the major strategies and structures utilized in the fabrication of single frequency injection lasers. 10 M
- b) Write a short note on surface emitting LED 6 M

5. a) Draw the structures of InGaAs APDS and compare the different photo diodes. 8 M
- b) Describe the basic detection process in a photoconductive detector. 8 M
6. a) With the help of a suitable block diagram explain the functioning of every element of a fiber optic receiver. 8 M
- b) Compare the advantages and disadvantages of using WDM in optical fiber communication system. 8 M