CBCS SCHEME

USN | | | | | | | | | | |

15EC82

Eighth Semester B.E. Degree Examination, June/July 2023
Fibre Optics and Networks

Time: 3 hrs. Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. With relevant diagrams, explain the different types of optical fibers. Considering the number of modes and material composition of the core. **(08 Marks)**

b. Consider the core of an optical fiber made up of Silica, with refractive index of 1.8 and cladding index is 2% less than core. Calculate :
(i) NA
(ii) Acceptance angle
(iii) Critical angle
(iv) Refractive index of cladding **(08 Marks)**

OR

2 a. Explain mode field diameter of single mode fiber. **(04 Marks)**

b. Explain briefly about the fiber materials used in optical communication. **(06 Marks)**

c. Discuss ray theory modes for multimode step index and graded index fiber. **(06 Marks)**

Module-2

3 a. Explain:
(i) Linear scattering losses
(ii) Non-linear scattering losses **(08 Marks)**

b. List and sketch different types of splicing techniques and connectors. **(08 Marks)**

OR

4 a. Explain different absorption mechanisms in optical fibers. **(08 Marks)**

b. A four part multimode fiber FBT coupler has 60 μω optical power launched into port 1. The measured output port at ports 2, 3 and 4 are 0.004, 26.0 and 27.5 μω respectively. Determine the excess loss, insertion losses between input and output ports, cross talk and split ratio for device. **(08 Marks)**

Module-3

5 a. Explain Fabry Perot Resonator Cavity of lasor with a neat diagram. **(08 Marks)**

b. Explain the different amplifiers used in optical receiver. **(08 Marks)**

OR

6 a. What are the characteristic requirements of an optical source? With the help of neat diagram, describe the operation of surface emitting LED. **(08 Marks)**

b. Briefly discuss possible sources of noise in optical fiber receiver. **(08 Marks)**

Module-4

7 a. Explain optical isolators and circulators. **(08 Marks)**

b. Briefly discuss Raman amplifiers. **(08 Marks)**

OR

8 a. Explain the amplification mechanism in EDFA amplifier with the help of energy band diagram. **(10 Marks)**

b. Write a note on :

(i) Diffraction gratings

(ii) Tunable right sources **(06 Marks)**

Module-5

9 a. Explain public telecommunication network review with neat diagram. **(08 Marks)**

b. Explain an optical packet switched network with neat diagram. **(08 Marks)**

OR

10 a. Explain the concept of optical burst switching. **(08 Marks)**

b. Explain the different types of optical networking node elements. **(08 Marks)**

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