USN | | | | | | | | | | | | 15EC82

Eighth Semester B.E. Degree Examination, June/July 2019
Fiber 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 the help of neat diagram, explain the man blocks of an optical fiber communication link. **(10 Marks)**
     b.   Explain the advantages and disadvantages and applications of optical fiber communication system. **(06 Marks)**

OR

2   a.   With the neat diagram, discuss the structure of single mode and multimode step index fiber with advantages for each type. **(08 Marks)**
     b.   A silica glass optical fiber has a core refractive index of 1.480 and the cladding refractive index of 1.460 (n_1 = 1.480, n_2 = 1.460) calculate critical angle, acceptance angle and numerical aperture and the number of guided modes at 1300mm if cone radius is 20μm. **(08 Marks)**

Module-2

3   a.   Explain different absorption mechanisms in optical fibers. **(08 Marks)**
     b.   Explain linear and non–linear scattering losses in optical fibers. **(08 Marks)**

OR

4   a.   Explain macro bending and micro bending losses with a neat diagram. **(06 Marks)**
     b.   Explain briefly about chromatic dispersion within an optical fiber. **(06 Marks)**
     c.   When the mean optical power launched into an 8 km length of fiber is 120 μw, the mean optical power at the fiber output is 0.3μw.
          Determine :
          i) The overall signal attenuation or loss in decibels thro' the fiber assuming that there are no connectors and splices.
          ii) The signal attenuation per kilometer for the fiber. **(04 Marks)**

Module-3

5   a.   Draw the diagram of a typical GaAlAS double Hetrostructure LED along with energy band diagram and refractive index profile and explain. **(10 Marks)**
     b.   Explain the terms :
          i)   Spontaneous emission
          ii) Stimulated emission
          iii) Quantum efficiency. **(06 Marks)**

OR

6   a.   Explain Fabry–Perot resonator cavity of laser with a neat diagram. **(06 Marks)**
     b.   Briefly discuss the possible sources of noise in optical fiber receiver. **(06 Marks)**
     c.   A GaAs laser operating at 850nm Los 560μm length and refractive index n = 3.7. What are the frequency and over length spacing's? **(04 Marks)**

Module-4

7 a. Explain the operational principle and implementations of WDM with diagram. (08 Marks)
   b. Explain polarization independent Isolator with a neat diagram. (08 Marks)

OR

8 a. Explain optical circulators and optical add/drop multiplexers in detail. (06 Marks)
   b. Explain the amplification mechanism in EDFA amplifier with the help of energy band diagram. (10 Marks)

Module-5

9 a. Explain about synchronous networks with STS frame structure. (08 Marks)
   b. Describe about internet protocol and in evolution over physical layer evolution and traffic flow pattern with relevant diagram. (08 Marks)

OR

10 a. Explain with neat diagrams, Wavelength convertible routing network architecture. (08 Marks)
   b. Write short note on optical fiber access networks and local are networks. (08 Marks)

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