Reg. No. : | | | | | | | | | | |

Question Paper Code: 47402

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2018

Seventh Semester

Electronics and Communication Engineering

14UEC702-OPTICAL COMMUNICATION AND NETWORKS

(Regulation 2014)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Optical fiber cables are made from _____and_____ and has _____ bandwidth
   (a) Plastic, copper, finite (b) Plastic, glass, infinite
   (c) Plastic, glass, finite (d) Plastic, Copper, infinite
2. The cutoff normalized frequency of single mode fiber is
   (a) $V_C = 2.504$ (b) $V_C = 2.045$
   (c) $V_C = 2.450$ (d) $V_C = 2.405$
3. Scattering loss occurs due to
   (a) Microscopic variations (b) Compositional fluctuations
   (c) Semi-permanent joint (d) All of the above
4. The electric field orientation of a light signal is referred to as
   (a) Penetration (b) absorption
   (c) polarization (d) All of the above

5. Single mode laser sources are used for

(a) Short distance communication (b) Medium distance communication

(c) Long distance communication (d) All of the above

6. RAPD is

(a) Rise through avalanche photo diode (b) Repeat through avalanche photo diode

(c) Reach through avalanche photo diode (d) Reduce through avalanche photo diode

7. The advantages of preamplifier is

(a) Low bandwidth (b) High bandwidth (c) Low gain (d) Low dynamic range

8. A common method for determining the total fiber attenuation per unit length is

(a) Interferometric method (b) Cut-back method

(c) Time domain method (d) Frequency domain method

9. The transfer of information from source to destination through a series of intermediate nodes is

(a) Topology (b) Routing (c) Switching (d) Network

10. The non linearity of a propagating signal in carrier induced phase modulation is called

(a) Kerr effect (b) chirp effect

(c) Optical loss (d) cross phase effect

PART - B (5 x 2 = 10 Marks)

11. What is total internal reflection in a fiber?.

12. What is meant by ISI?

13. What is meant by hetero junction structure?

14. What are the methods used to measure the fiber refractive index profile?

15. What is optical CDMA?

PART - C (5 x 16 = 80 Marks)

16 (a) With diagram, explain the acceptance angle and numerical aperture of fibres and Classify them. (16)

Or

(b) Derive the cutoff wavelength ,effective refractive index ,group delay and mode delay factor of single mode fiber. (16)

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17 (a) (i) When the mean optical power launched into an 8km length of fiber is 120µW,the mean optical power at the fiber output is 3µW.Determine (8)

a) The overall signal attenuation or loss in decibels through the fiber assuming there are no common connectors or splices

b) The signal attenuation per kilometer for the fiber

c) The overall signal attenuation for a 10km optical link using the same fiber with splices at 1km intervals each giving attenuation of 1dB

d) The numerical aperture input/output power ratio

(ii) write short notes on fiber bend loss (8)

Or

(b) Describe about fiber connectors, splices, and couplers (16)

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18 (a) Explain the structure of surface emitting and edge emitting LEDs. (16)

Or

(b) Discuss about the probability of error of fiber optic receiver. (16)

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19 (a) What is the role of preamplifier in optical receiver? Explain the different types of Pre amplifiers. (16)

Or

(b)Derive the probability of error of fiber optic receiver (16)

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20 (a) Explain SONET layers and frame structure with neat diagram (16)

Or

(b) Discuss any three non-linear effects on network performance. (16)