Total No. of Questions: 8]

SEAT No. : [ ]

PB2298

[Total No. of Pages :2

[6263]-137
B.E. (E & TC)
FIBER OPTIC COMMUNICATION
(2019 Pattern) (Semester-VIII) (404190)

Time : 2½ Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.***
2) ***Figures to the right indicate full marks.***
3) ***Assume the suitable data, if necessary.***
4) ***Neat diagrams must be drawn wherever necessary.***

Q1) a) Explain the following parameters associated with the photo detectors: quantum efficiency, responsivity, long cutoff wavelength.

For a Si photodetector calculate the long cutoff wavelength. **[8]**

b) State and explain the requirements from photo detectors.Draw and explain the working of a photo transistor. **[10]**

OR

Q2) a) Explain the following parameters associated with the photo detectors: thermal noise, dark current noise, quantum noise and receiver sensitivity. **[8]**

b) Describe with the aid of suitable diagrams the avalanche photo diode (APD). Compare between the photodiodes: p-n and p-i-n photo detectors. Comment on their usefulness from link design perspective. **[10]**

Q3) a) Explain the concept of wavelength division multiplexing (WDM) technique. Draw the block diagram of a WDM system and explain the function of each block. **[8]**

b) Write the optical power budget equation for a point-to-point link. A 40 km Fast Ethernet single mode link with 0.4 dB/km loss, at 1310 nm is used with two connector pairs and 5 splices between a transmitter of - 8 dBm power and receiver with a sensitivity of - 38 dBm.

Given: one Connector pair loss =0.75

dB& Per splice loss = 0.1dB. calculate:

i) Total connector loss and total splice loss.

ii) Total link loss considering a safety margin of 6 dB.

iii) Estimate the maximum total fiber distance for the fiber optic link. **[9]**

OR

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Q4) a) Explain with neat block diagram. **[8]**

i) Link power budget

ii) Rise time budget

b) State the various types of amplifiers used in lightwave systems amplifiers. Compare between SOA and EDFA type of amplifiers. **[9]**

Q5) a) Define Optical Network. Explain the term optical node & light path with a suitable diagram relative to optical network.

Define network topology. State and explain types of network topologies with suitable diagram. **[9]**

b) With suitable diagrams, explain the concept of FTTH and FTTP. State advantages of FTTH and FTTP. **[9]**

OR

Q6) a) What is FTTX. What are the different categories of FTTX? Explain FTTX with respect to architecture, advantages. Compare the categories. **[9]**

b) With suitable diagrams explain terrestrial and Submarine optical networks. **[9]**

Q7) a) Explain the various methods used to measure the fiber attenuation. Compare and comment on the accuracy of each of the methods. **[8]**

b) Draw and explain with a block diagram the working of an OTDR. Draw the trace of an OTDR and explain the various events observed on the display of an OTDR. **[9]**

OR

Q8) a) State and explain the need of a BER tester. Explain the concept of eye diagram and the various parameters that can be measured from the eye diagram. **[8]**

b) Explain the following instruments used for the testing and measurement purpose in optical fiber networks: **[9]**

- visual fault indicator
- optical power meter
- OSA

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