Total No. of Questions : 8]

SEAT No. :

PF5292

[Total No. of Pages : 3

[6627]-137

B.E. (Electronics & Telecommunication Engineering)

FIBER OPTIC COMMUNICATION

(2019 Pattern) (Semester-VIII) (404190)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Solve Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8.***
2) ***Figures to the right indicate full marks.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Assume suitable additional data, if necessary.***

Q1) a) With the help of diagram, explain working of p – n photodiode. Draw its output characteristics. **[6]**

b) Compare PIN diode and APD. **[6]**

c) An InGaAs avalanche photo detector has a quantum efficiency of 90% at a wavelength of 1310 nm. If an incident optical power of 0.5 μW produces a multiplied photocurrent of 15 μA. Calculate the responsivity and multiplication factor. **[6]**

OR

Q2) a) Explain the following terms: **[6]**

i) Quantum efficiency

ii) Responsivity

iii) Dark Current

b) What is a photo detector? Discuss various requirements of a photo detector to be used in optical communication. **[6]**

c) A photodiode has a quantum efficiency of 65% when photons of energy 1.5×10^{-19} J are incident upon it. **[6]**

i) At what wavelength is the photodiode operating?

ii) Calculate the incident optical power required to obtain a photocurrent of 2.5 μA.

P.T.O.

SPPU Question Paper CEGP019671 103.157.122.163 02/06/2026 13:52:30 in-pnq-static-163-122-157-103

Q3) a) Draw the block diagram of a point to point optical fiber link and explain the function of blocks needed in it. **[6]**

b) Sketch and explain implementation of a typical WDM network. Enlist some of the active WDM components. **[6]**

c) For the multimode fiber link following parameters are recorded: **[5]**

i) Rise time of LED with drive circuit= 18ns

ii) LED Spectral Width = 45nm.

iii) Material dispersion rise time 20ns.

iv) Receiver Bandwidth = 30MHz.

v) Modal dispersion rise time = 4ns.

Calculate system rise time.

OR

Q4) a) Write a short note on. **[6]**

i) Optical power loss model

ii) Rise time budget.

b) Explain the working principle of Fiber Bragg Grating. With the help of diagram explain how it is useful as an Optical Add Drop Multiplexer. **[6]**

c) Compare circulator and isolator. **[5]**

Q5) a) Define optical network topology. State and explain types of network topologies with suitable diagram. **[6]**

b) What is SONET, explain with the various layers? Enlist advantages, applications. **[6]**

c) What is the role of fiber optic network in 5G networks, Explain in detail. **[6]**

OR

Q6) a) With the help of diagram, explain various elements used in optical networks. **[6]**

b) Compare active optical network (AON) and passive optical network (PON). **[6]**

c) Write a short note on Submarine optical networks. **[6]**

SPPUQuestionPapers.com CEGP01967 103.157.122.163 02/06/2026 13:52:30 in-pnq-static-163-122-157-103

Q7) a) Explain OTDR with the help of block diagram. Enlist any two advantages. **[6]**

b) Explain Eye diagram test. Define fundamental measurement parameter. **[6]**

c) Define bit error ratio (BER), Draw & Explain BER test setup. **[5]**

OR

Q8) a) Draw and explain the schematic of the experimental setup used to calculate fiber attenuation using the cutback method. **[6]**

b) Write a short note on Optical Spectrum Analyzer. **[6]**

c) An engineer wants to find the attenuation at 1310 nm of a 4.95-km long fiber. The only available instrument is a photo detector, which gives an output reading in volts. Using this device in a cutback attenuation setup, the engineer measures an output of 6.58V from the photo diode at the far end of the fiber. After cutting the fiber 2m from the source, the output voltage from the photo detector now reads 2.21V. What is the attenuation of the fiber in dB/km? **[5]**

SPPUQuestionPapers.com
CEGP019671
103.157.122.163 02/06/2026 13:52:30 in-pnq-static-163-122-157-103