Total No. of Questions :6]

SEAT No. :

P124

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BE/ Insem./APR - 169

B.E. (E & TC)

404190 : BROADBAND COMMUNICATION SYSTEMS

(2012 Course) (Semester - II)

Time : 1 Hour] *[Max. Marks :30*

Instructions to the candidates:

1) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6.***

2) ***Figures to the right indicate full marks.***

Q1) a) Compare Single mode and Muti-mode fibers. **[4]**

b) A single mode step index Fiber has core and cladding Refractive index as 1.498 and 1.495 respectively. Determine the core diameter required for the fiber to permit it's operation over the wavelength range 1.48 to 1.60 micro meter.

Calculate the new fiber core diameter to enable single mode transmission at a wave length of 1.30 micro meter. **[6]**

OR

Q2) a) Compare LED and LASER as optical sources in optical fiber communication. **[5]**

b) Enlist and explain four losses in optical fiber communication system. **[5]**

Q3) a) Explain the significance of Link Power Budget in Optical Fiber Communication System. Mention necessary important equations for the same. **[5]**

P.T.O.

b) An optical fiber system is to be designed to openate over an 8 Km length without repeaters. The rise time of chosen components are as follows

Source (LED) - 8 ns

Fiber : Intermodal - 5 ns/Km

Pulse (broadening) Intra modal : 1 ns/Km

Detector (PIN photodiode) : 6 ns

From system rise time considerations, estimate the maximum bit rate that may be achieved on the link when using an NRZ format. **[5]**

OR

Q4) a) Write a short note on Long Haul Systems. **[4]**

b) Write in detail the selection criteria for Optical Source, Optical fiber and Optical Receiver to establish point to point communication. **[6]**

Q5) a) Explain the operating principle of Wavelength Division Multiplexing (WDM), with neat diagram. **[4]**

b) Explain any two of the following.

i) Optical Isolators

ii) Optical Circulators

iii) Optical Amplifier **[6]**

OR

Q6) a) A 2×2 biconical tapered fiber bas input optical power p_o = 300 μ watt. The output power at the three others ports are P_1 = 150 μ w, P_2 = 65 μ w, P_3 = 8.3 nw.

Calculate coupling ratio, excess loss and insertion loss for the coupler. **[6]**

b) Explain working principle of Fiber Brag Grating (FBG) and it's application **[4]**