Registration no: | | | | | | | | | | |

Total Number of Pages: 2 **M.TECH**
ETPE204

2nd Sem M.Tech Regular/ BackExamination – 2014-15
SUBJECT NAME: OPTICAL COMMUNICATION
BRANCH(S): ETC
Time: 3 Hours
Max marks: 70
Q.CODE:T423

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1 Answer the following questions: (2 x 10)

a) What is the principle of total internal reflection.
b) State two differences between step index and graded index fiber.
c) A silica optical fiber has core refractive index 1.56 and cladding refractive index 1.53. Find out the numerical aperture of the fiber.
d) What do you understand by meridional rays?
e) An optical signal has lost 50% power after travelling 5km of fiber. What is the loss in dB/km of the fiber.
f) Write advantages of LED over LASER diode.
g) Why direct band gap semiconductor materials are used for manufacturing LED's.
h) What are the differences between TE and TM modes?
i) What is responsivity of a photodiode and how it is related to quantum efficiency?
j) Show the fundamental setup for a homodyne receiver.

Q2 a) What is dispersion? Calculate the pulse spread caused by material and waveguide dispersion at the 1550nm operating wavelength, if $\Delta\lambda$ = 1nm and L = 1km. (6)

b) The step index fiber having core diameter 210μm, numerical aperture 0.4 and operating wavelength 860nm, then find out the number of propagating modes. (4)

Q3 a) How do you classify the losses in the optical fiber? Discuss each of the losses briefly. (6)

b) Briefly explain the intermodal dispersion. (4)

Q4 Draw and explain the shape of a digital signal at different points along an optical link with neat sketch. (10)

Q5 a) Explain three key transition processes involved in LASER action with neat diagram. (6)

b) A silicon Avalanche Photo Diode has a quantum efficiency of 65% at a wavelength of 900nm. If 0.5 μW of optical power produces a multiplied (4)

photocurrent of 10 μA. Find the multiplication M.

Q6	a)	Briefly explain the working mechanism of Avalanche Photo Diode.	(6)
	b)	What do you mean by stimulating light wave?	(4)
Q7	a)	Discuss the fundamental concept of coherent light wave system with neat sketch.	(6)
	b)	Draw NRZ and RZ code patterns for the data sequence 1010110.	(4)
Q8		Write short notes on any two	(5 x 2)
	a)	Wavelength division multiplexing (WDM) technique	
	b)	Receiver sensitivity	
	c)	Single mode step index fiber	
	d)	Hetrodyne detection	