Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Seventh semester B.Tech examinations (S), September 2020

Course Code: EC405

Course Name: OPTICAL COMMUNICATION

Max. Marks: 100   Duration: 3 Hours

PART A

Answer any two full questions, each carries 15 marks.   Marks

1	a)	Define macroscopic and microscopic bending losses.	(5)
	b)	Explain Outside Vapor Phase Oxidation fabrication process with neat diagram. Compare it with MCVD process.	(10)
2	a)	Explain different types of materials used for making optical fibers.	(5)
	b)	Define attenuation constant. Explain the different attenuation mechanisms in optical fibers.	(10)
3	a)	Explain the following i) total internal reflection ii) axial numerical aperture in a graded index fiber.	(5)
	b)	Explain the working of surface emitting LED with neat diagram. Also explain its emission pattern.	(10)

PART B

Answer any two full questions, each carries 15 marks.

4	a)	Explain receiver sensitivity and quantum limit of detection of optical receiver.	(5)
	b)	In a coherent optical communication system operating on the basis of homodyne detection, the received optical power is 2 nW and the signal bandwidth is 1 GHz. Taking the quantum efficiency of the detection to be 0.8 and the wavelength as 1500 nm find the SNR in case of short noise limited performance.	(10)
5	a)	With the help of necessary figures, describe the working of an IMDD system.	(5)
	b)	Explain the working of APD. What do you meant by reach through effect?	(10)
6	a)	A photo detector generates a photo current of $0.25\mu A$ for an incident optical power of $0.8\mu W$ at operating wavelength of $0.87\mu m$. Estimate the quantum efficiency of photo detector at this wave length.	(5)
	b)	Derive the expressions for rise time and power budget analysis.	(10)

PART C
Answer any two full questions, each carries 20 marks.

7 a) What are the different components used in WDM system? Explain any two. (8)

b) Compare different parameters of any four optical amplifiers. (8)

c) What is Li-Fi technology? (4)

8 a) What are the advantages of free space optical communication? (4)

b) Explain the working of EDFA. What are the advantages of EDFA? (10)

c) What do you meant by fiber bragg grating? (6)

9 a) How a fault is detected in an optical fiber? Explain the principle with necessary equations. (5)

b) What is TDFA? Explain the working of TDFA. (10)

c) What is tunable optical filter? (5)

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