Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SEVENTH SEMESTER B.TECH DEGREE EXAMINATION(S), MAY 2019

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)	Draw the block diagram of a light wave system. Mention the advantages of Optical fiber Communication system.	(5)
	b)	Explain the working principle of laser action? How a semiconductor diode functions like a laser diode?	(10)
2	a)	Differentiate between spontaneous and stimulated emission.	(5)
	b)	Explain the mode theory for the propagation of light in optical fiber.	(10)
3	a)	Explain the Modified Chemical Vapor Deposition process in fiber fabrication.	(5)
	b)	Explain the Numerical Aperture of an optical fiber with neat diagram. Calculate the fractional index change for a given optical fiber if the refractive indices of the core and cladding are 1.563 and 1.498 respectively. Also, calculate (i) numerical aperture (ii) angle of acceptance in air.	(10)

PART B

Answer any two full questions, each carries 15 marks.

4	a)	Briefly explain the different selection criteria for detectors using in optical communication.	(5)
	b)	Draw the schematics of pin photodiode and APD and explain its working.	(10)
5	a)	What is meant by responsivity? How it is related to quantum efficiency?	(5)
	b)	A transmitter has an output power of 0.1mW. It is used with a fiber having NA=0.25, attenuation of 6dB/Km and length 0.5 km. The link contains two connectors of 2dB average loss. The receiver has a minimum acceptable power (sensitivity) of -35dBm. The design has allowed a 4dB margin. Calculate the link power budget.	(10)

6 a) An InGaAs pin photodiode has λ=1300 nm, I_D = 4 nA, η = 0.90, R_L== 1000 Ω, and the surface leakage current is negligible. The incident optical power is 300nW (-35 dBm) and the receiver bandwidth is 20 MHz. Find the various noise terms of the receiver. (5)

b) What are the essential components required for establishing a point- to point link. What are the various losses associated with it? Explain with neat optical power loss model. (10)

PART C

Answer any two full questions, each carries 20 marks.

7 a) Explain the Fiber Bragg Grating technology and point two applications. (7)

b) Explain the working of Semiconductor Optical Amplifier. (7)

c) Compare the performance of different optical amplifiers. (6)

8 a) Explain the working principle of EDFA. Give the advantages of EDFA. (10)

b) How does an OTDR work? Draw the typical OTDR trace. Name two faults that can be detected by OTDR. (10)

9 a) Explain with block diagram the working of optical add/drop multiplexer. Explain why it is required in optical communication system. (7)

b) Explain the working of TDFA. (7)

c) What is Li Fi technology? (6)

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