Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SEVENTH SEMESTER B.TECH DEGREE EXAMINATION(R&S), DECEMBER 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) Explain the mode theory for propagation of light in optical fiber? (9)

b) Draw and explain the Outside vapour-phase deposition process in fiber fabrication? (6)

2 a) Write the working principle of LASER and compare it with LED using neat diagrams. (9)

b) A graded index fiber with parabolic refractive index has n_1=1.48 and n_2=1.46 if core radius is 20μm.Find the number of modes at 1300nm and 1550nm? (6)

3 a) Explain different types of intramodal dispersion and derive the expression for pulse spread and dispersion factor for each case. (8)

b) Explain different types of bending losses in optical fibers? (4)

c) What is meant by Surface emitting LEDs? (3)

PART B

Answer any two full questions, each carries 15 marks.

4 a) Derive an expression for receiver sensitivity and also explain quantum limit . (8)

b) Explain the physical principles of PIN photodetector? (7)

5 a) Discuss the rise-time budget analysis in an optical fiber link and write about its advantages. (9)

b) A given APD has a quantum efficiency of 65 % at a wavelength of 900nm. If 0.5μw of optical power produces a multiplied photocurrent of 10 μA. Find the multiplication factor M? (6)

6 a) Briefly discuss the fundamental receiver operation in optical communication. (6)

b) Write the advantages of Soliton based communication and explain the generation of soliton wave. (5)

c) A photodiode is constructed of GaAs, which has band gap energy of 1.43 eV at 300 K. What is the cutoff wavelength of this device? (4)

PART C

Answer any two full questions, each carries 20 marks.

7 a) Explain the operational principle of an OTDR and write the important performance parameters. (7)

b) Compare the working between FP-SOAs and TW-SOAs. (8)

c) Write a short note on Tunable optical filters? (5)

8 a) Explain the operation of Erbium–Doped fiber Amplifier. List out the different advantages. (12)

b) What is meant by Fiber Bragg Grating? Write any one application in detail. (8)

9 a) What are the differences between fused fiber coupler and waveguide coupler? (8)

b) Write the general characteristics and working principle of Raman Amplifier. (8)

c) Why reconfigurable OADMs are more preferred in metro networks? (4)

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