

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S7 (S, FE) / S7 (PT) (S, FE) Examination December 2023 (2015 Scheme)

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) Write a short note on intramodal dispersion. (5)
- b) Write a short note on scattering losses in a fiber. (5)
- c) Explain the working principle of laser. (5)
2. a) Discuss the absorption losses in optical fibers. Compare and contrast the intrinsic and extrinsic absorption mechanisms. (7)
- b) What is amplified spontaneous noise? (3)
- c) Write a short note on Surface emitting LEDs. (5)
3. a) What are photonic crystal fibers? Explain the different types of PCF with neat diagrams. (10)
- b) Explain the different types of materials used for making optical fibers. (5)

PART B*Answer any two full questions, each carries 15 marks.*

4. a) Explain the generation of Soliton wave. Also write the advantages of soliton based communication. (5)
- b) Describe the working of IMDD system with figure. (5)
- c) Write short note on probability of error in digital receiver performance. (5)
5. a) Explain the construction of an APD with a neat diagram. Briefly explain the process of avalanche multiplication in an APD. Also state its advantages and disadvantages as a detector in optical communication. (10)
- b) A given APD has a quantum efficiency of 65% at a wavelength of 900nm. If $0.5\mu\text{W}$ of optical power produces a multiplied photocurrent of $10\mu\text{A}$. Find the multiplication factor M. (5)

- 6 a) Briefly explain rise time budget analysis in an optical link and also explain about its advantages. (9)
- b) Define quantum efficiency and responsivity of photodetector. Derive the relationship between the two. (6)

PART C

Answer any two full questions, each carries 20 marks.

- 7 a) Write a short note on Tunable Optical Filter. (5)
- b) Describe the principle of SOA. (10)
- c) What are the advantages of Li-Fi technology? (5)
- 8 a) Explain the working and principle of OTDR. Explain how refractive index measurements are done using OTDR. (10)
- b) Write a short note on TDFA. (5)
- c) Explain the working of Raman amplifier. (5)
- 9 a) Discuss in detail about visible light communication. (5)
- b) Write short note on add/drop multiplexer. (5)
- c) Draw the block schematic, energy band diagram and gain spectrum of EDFA. (10)
- Explain in detail the working principle of EDFA.
