ADAMAS UNIVERSITY PURSUE EXCELLENCE	**ADAMAS UNIVERSITY** **END (EVEN) SEMESTER EXAMINATION: MAY 2021** (Academic Session: 2020 – 21)		
Name of the Program:	B. Tech	**Semester:**	VI
Paper Title:	Optical Communication	**Paper Code:**	EEC61117
Maximum Marks:	40	**Time duration:**	3 Hrs
Total No of Questions:	09	**Total No of Pages:**	02
(Any other information for the student may be mentioned here)	**1.** At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam. **2.** All parts of a Question should be answered consecutively. Each Answer should start from a fresh page. **3.** Assumptions made if any, should be stated clearly at the beginning of your answer.		

Answer all the Groups

Group A

Answer all the questions of the following $5 \times 1 = 5$

1. **a)** What is the full form of MDF?
b) What is the other name for V-number?
c) What is the full form of OTDR? What do you mean by Birefringence?
d) Name the three phenomenon's involved in working of LASER.
e) Which shape of the refractive index profiles is suitable for achieving the dispersion-flattened design of a single-mode fiber?

GROUP –B

Answer *any three* of the following $3 \times 5 = 15$

2. The refractive indices of core and cladding materials of a step index fiber are 1.48 and 1.45, respectively. Calculate: (i) numerical aperture, (ii) acceptance angle, and (iii) the critical angle at the core-cladding interface and (iv) fractional refractive indices change. **[5]**

3. a) What do you mean by population inversion? Derive Einstein relationship connecting absorption, stimulated emission and spontaneous emission. **[3+2]**

4. a) Define quantum efficiency and responsivity of a detector. When 3×10^{11}photons each with a wavelength of 0.85 µm are incident on a photodiode, on average 1.5×10^{11} electrons are collected. Determine the quantum efficiency and responsivity of the photodiode at the wavelength of 0.85 µm.
[3+2]

5. Explain the need of cladding in an optical fiber. **[5]**

6. Draw and explain about the three windows of optical communication. Which of these three windows have the lowest attenuation? **[5]**

GROUP –C

Answer *any two* of the following $2 \times 10 = 20$

7. **a)** What is the difference between conventional dispersion shifted (DSF) and dispersion flattened fibers?
b) Write a technical short note on OTDR with all necessary diagrams and plots. **[5+5]**

8. **a)** A step-index fiber has a numerical aperture of 0.17and a core diameter of 100 µm. determine the normalized frequency parameter of the fiber when light of wavelength 0.85 µm is transmitted through it. Also estimate the number of guided modes propagating in the fiber.
b) Differentiate between surface-emitting and edge-emitting LED's with suitable figures. **[4+4+2]**

9. a) Draw and explain the simple block diagram of an optical communication system. Also, discuss the difference between splice and connectors.
b) Explain pulse broadening or dispersion in your own words with suitable diagram. What is the effect of pulse broadening on data rate? Explain. **[6+4]**
