Graphic Era HILL UNIVERSITY
Established by an Act of the State Legislature of Uttarakhand (Adhiniyam Sankhya 12 of 2011)
University under section 2(f) of UGC Act, 1956

Mid Term Evaluation (Even) Semester Examination March 2025

Roll no.....

Name of the Course: B.Tech
Semester: VIII
Name of the Paper: Optical Fiber Communication
Paper Code: TEC 802
Time: 1.5 hour **Maximum Marks: 50**

Note:
(i) Answer all the questions by choosing any one of the sub-questions
(ii) Each question carries 10 marks.

Q1. (10 Marks) CO: 1
a. What is the critical angle of incidence? Explain the condition of total internal reflection.

OR

b. 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 (iii) the critical angle and (iv) fractional refractive indices change

Q2. (10 Marks) CO: 1
a. Define the concept of numerical aperture in optical fibers. Explain its significance in determining the acceptance angle and light-gathering ability of the fiber.

OR

b. When a long single mode fiber is operating at a wavelength of 1.3mm, the attenuation is 0.5 dB/Km. The core diameter of the fiber is 6 μm and the laser source bandwidth is 700 MHz. Calculate the threshold optical powers for stimulated Brillouin and Raman scattering.

Q3. (10 Marks) CO: 1, 2
a. Draw the general optical fiber communication block diagram. How it is different from other communication system?

OR

b. What is Step Index and Graded Index fibers? Explain structures, differences in light propagation, and how they impact signal transmission performance?

Q4. (10 Marks)
a. What is absorption loss in optical fiber? What are the types of material absorption losses in optical fiber? CO: 2

OR

b. Differentiate between intramodal and intermodal dispersion, and explain their effects on optical signal quality.

Q5. (10 Marks) CO: 2
a. What is modal birefringence in optical fibers?

OR

b. Discuss overall fiber dispersion in multimode and single-mode fibers.