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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST-1 EXAMINATION – FEB 2020

B.Tech VIIIth Semester (ECE)

COURSE CODE: 11B1WEC834 MAX. MARKS: 15

COURSE NAME: Optical Communication Systems

COURSE CREDITS: 3 MAX. TIME: 1HRS

Note: All questions are compulsory. Carrying mobile phone during examinations will be treated as a case of unfair means.

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1. With the help of suitable diagram, differentiate between step index and graded index fiber. Also explain how graded index fiber eliminates the multipath loss. (CO-1) **[4]**
2. A step index fiber has a numerical aperture of 0.17 and a cladding refractive index of 1.46. Determine (CO-1) **[2]**
   a) The acceptance angle of the fiber when it is placed in water (n for water is 1.33)
   b) Critical angle at the core cladding interface.
3. Using Maxwell's equations show how a ray of light behaves in an inhomogenous medium. (CO-2) **[4]**
4. Calculate the maximum thickness of the guide slab of a symmetrical planar waveguide so that it supports the first 10 modes. Take n_1=3.6, n_2=3.58 and λ=0.90μm. Calculate also the maximum and minimum values of the propagation constant β. (CO-1) **[3]**
5. Differentiate between the propagation parameters k, β and b. How are they interrelated? (CO-2) **[2]**

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