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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- September 2016

B. Tech (7^{th})/ M. Tech (1^{st}) Semester

Electronics and Communication Engineering

COURSE CODE: **10M11EC112** MAX. MARKS: 15

COURSE NAME: **ADVANCED SATELLITE AND FIBER OPTIC COMMUNICATION**

COURSE CREDITS: **03** MAX. TIME: 1Hr

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

Q. 1(a) Draw the generalized configuration of a fiber optic communication system and write brief description of each block. [3]

(b) Discussed the several low-loss operating wavelength/windows of the fiber optic communication system. [2]

Q. 2 (a) Derive the mathematical expression of the multipath time dispersion for step index optical fiber. How can this multipath dispersion be minimized? [3]

(b) For the step-index optical fiber which has a core of refractive index 1.5, a cladding of refractive index 1.48, and core diameter 100 μm, what are the minimum and maximum numbers of reflections per meter for the rays guided by it? [2]

Q. 3(a) Derive the expression for the material dispersion parameters and draw its variation with pure silica. [3]

(b) A symmetric step-index planar waveguide is made of glass with $n_1 = 1.5$, and $n_2 = 1.49$. The thickness of the guide layer is 9.83 μm and the guide is excited by a source of wavelength $\lambda = 0.85$ μm. What is the range of propagation constants? What is the maximum number of mode supported by the guide? [2]