

**B.Tech. – VIEP – ELECTRONICS AND
COMMUNICATION ENGINEERING
(BTECVI)**

00194

Term-End Examination

June, 2014

BIEL-017 : OPTICAL FIBER COMMUNICATION

Time : 3 hours

Maximum Marks : 70

*Note : Attempt any **seven** questions out of ten questions.
Make suitable assumptions if needed. All questions
carry equal marks. Use of scientific calculators is
permitted.*

1. (a) What are the advantages of an optical fiber communication ? 5
- (b) What is the WDM concept ? Explain in detail. 5
2. (a) Explain the effective refractive index, group delay and mode delay factor for single mode fiber. 5
- (b) Explain mode field diameter in detail. 5
3. (a) Explain attenuation in optical fiber in detail. 5
- (b) Explain intramodal and intermodal dispersion for step and graded index fiber. 5

4. (a) Explain optical feedback and threshold condition. 5
- (b) Explain spontaneous and stimulated emission in p-n junction. 5
5. (a) Draw the structure of a LED and explain its characteristics. 5
- (b) Write drawbacks and advantages of LED and DH. 5
6. (a) Consider a Multimode silica fiber which has a core refractive index $n_1 = 1.48$ and a cladding index $n_2 = 1.46$.
- Calculate 5
- (i) Critical Angle
- (ii) Numerical aperture
- (iii) Acceptance Angle in air.
- (b) Explain the block diagram and detection principle of coherent optical fiber system. 5
7. (a) Explain APD Receiver structure in detail. 5
- (b) A single mode optical fiber has a beat length of 10 cm at 1200 nm. Calculate the birefringence. 5
8. (a) Explain noise source in optical fiber communication in detail. 5
- (b) Explain direct intensity modulation using AM, FM and PM. 5

9. (a) Explain the working of pre-amplifier in the optical fiber communication with the help of suitable diagram. 5
- (b) What is the automatic gain control and equalization in optical fiber communication system? 5
10. Write short notes on any *two* of the following : $2 \times 5 = 10$
- (i) Photo transistors
 - (ii) Modes in a planar and cylindrical guide
 - (iii) Polarization maintaining fiber
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