

Roll No.

24443

B. Tech. 7th Semester (ECE)

Examination – May, 2019

OPTICAL COMMUNICATION

Paper : ECE-415-F

Time : Three Hours] [Maximum Marks : 100

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting *one* question from each Section. Question No. 1 is *compulsory*. Marks are indicated against each question.

- 1. (a) What are the advantages of LED ? 4
- (b) Define threshold current. 3
- (c) How bending effects the optical fiber communication ? 5

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- (d) What do you mean by fiber connectors ? 4
- (e) What is multiplication process in APD ? 4

SECTION – A

- 2. (a) Differentiate between step index fiber and graded index fiber, with the help of ray diagram. Also explain how ray travelled in both of them ? 10
- (b) What do you mean by group and phase velocity in optical communication ? 10
- 3. (a) Give advantage of optical fiber communication and explain basics of transmission of light rays. 14
- (b) Can radio frequency signal used as carrier in optical communication ? Justify your answer. 6

SECTION – B

- 4. (a) Explain the operation of both optical isolator and optical circulators. Discuss use of these devices in wavelength division multiplexing systems as three or four port devices. 10

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(b) Discuss absorption losses in optical fibers, comparing and contrasting the intrinsic and extrinsic absorption mechanism. 10

5. (a) Explain the various modes of propagation in step index fiber and derive the equation. 10

(b) Explain different types of optical fiber structures. 10

SECTION – C

6. What is LED and also discuss its characteristics? 20

7. (a) How laser is coupled to fiber? 10

(b) Explain the different injection lasers and explain the concept and operation of quantum well injection laser diode. 10

SECTION – D

8. (a) Explain the Avalanche Photo Diode (APD) in detail. 10

(b) What are the differences between semiconductor photo diodes with and without internal gain, take **one** example for each type? 10

9. (a) Discuss the operation of the silicon RAPD. Describe how it differs from p-i-n photodiode. 10

(b) Explain the principle of PIN photodetector. Mention its advantages and drawbacks. 10

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