008703

Dec. 2021
B.Tech. (ECE/EL)-7th SEMESTER
Fiber Optic Communication (ECEL-704//ELOE-118)

Time : 90 Minutes]   [Max. Marks : 25

Instructions :

1. *It is compulsory to answer all the questions (1 mark each) of Part-A in short.*

2. *Answer any three questions from Part -B in detail.*

3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART - A

1. (a) State the condition for TIR in Fiber Optic Cable.   (1)

   (b) "Repeaters are used in Fiber Optic Communication" comment.   (1)

   (c) Compare direct band gap and indirect band gap semiconductors.   (1)

   (d) If a InGaAs photodiode is having responsivity 0.8 A/w and optical power level of 25 μW then what will be the photocurrent generated by photodiode?   (1)

(e) What are the problems caused by self-phase and cross-phase modulations? (1)

(f) Define group velocity. (1)

(g) What is chirping? (1)

(h) What do you mean by optical waveguide? How it is different from Electrical waveguide? (1)

(i) What are the *two* main causes of Intramodal dispersion? (1)

(j) What do you mean by Long Haul Communication? (1)

PART - B

2. (a) State the different types of fibers based on Index profile and explain it in detail. (3)

(b) Describe the structure of OTDR. Explain the method of dispersion measurement using OTDR. (2)

3. (a) Power generated internally with in a DHLED is 28.4 mW at a drive current of 40 mA. Find the peak emission wavelength from the device when radiative and non-radiative combination of lifetime of minority carriers in the active region are 30 ns and 50 ns respectively. (2)

(b) Discuss the principle of operation of LASER diodes. What are the effects of temperature on the performance of a LASER diode? (3)

4. (a) Explain basic principle of operation of photo detector. Explain the working of PIN and APD as photodetector, also compare their performance. (3)

(b) Draw and explain the principle of operations of an EDFA. (2)

5. (a) State the working principle of Raman amplifier and state its applications. (3)

(b) Explain with the help of a neat block diagram the working of an optical switch. (2)

6. (a) Discuss the concept of Wavelength Division Multiplexing. (2)

(b) Explain all aspects of Link Power Budget and Rise Time Budget. (3)