Roll No. | | | | | | | | | | | | |

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(Electrical & Electronics Engg.)(2013 & Onwards E-III)
(Sem.–7)

OPTICAL FIBER COMMUNICATION

Subject Code : BTEEE-805C
M.Code : 71971

Time : 3 Hrs. Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Answer briefly :

a) Explain fifth generation of WDM lightwave systems.

b) Give importance of DFB lasers used in optical transmitters.

c) Explain optical receiver sensitivity and give its units also.

d) Differentiate between SPM and XPM nonlinear effects.

e) Why generally III-V alloys type semiconductor materials are used in fabrications of optical sources.

f) Give source limitations becoming obstacles in transmitter circuit design.

g) What is the importance of normalized frequency? Define it.

h) What are merits & demerits of preamplifiers circuits used in receiver circuits?

i) Explain the dispersion shifted and dispersion flatted fibers.

j) What do you understand by thermal, noise limited optical receiver?

SECTION-B

2. Explain briefly Rayleigh scattering loss mechanism in optical fiber. How its effect can be reduced?

3. Describe briefly speed versus sensitivity tradeoff of photo detectors.

4. Describe III-V alloys type semiconductor materials generally used for fabrications of optical sources. Suggest some names of materials for typical wavelengths.

5. Discuss light wave systems used for local area networks.

6. A 1.55 μm continuous wave signal with 6 dBm power is launched into a fiber with 50 μm^2 effective and area. After what fiber length the nonlinear phase shift induced by SPM becomes 2π. Assume $n_2 = 2.6\times10^{-20} m^2/$ W and neglect fiber losses.

SECTION-C

7. An analog optical fiber system has a modulation bandwidth of 40 MHz and a modulation index of 0.6. The system utilizes an APD receiver with responsivity of 0.7 and is quantum noise limited. An SNR (rms signal power to rms noise power) of 35 dB is obtained when the incident optical power at the receiver is –30dBm. Assuming the detector dark current may be neglected, determine the excess avalanche noise factor at the receiver.

8. Explain in detail loss limited light wave system and dispersion limited light system.

9. Explain high capacity point to point WDM lightwave systems.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.