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Total No. of Pages: 02
Total No. of Questions: 09

B.Tech.(EC) (Sem.-7th & 8th)
OPTICAL FIBER COMMUNICATIONS
Subject Code: EC-404
Paper ID: [A0329]

Time: 3 Hrs.

Max. Marks: 60

INSTRUCTION TO CANDIDATES:

- 1) *Section-A is Compulsory.*
- 2) *Attempt any four questions from Section-B.*
- 3) *Attempt any two questions from Section-C.*

SECTION-A

(10x2=20)

Q.1. Write briefly:

- a) Define dispersion in multimode fibers? What is its effect?
- b) Define quantum efficiency and responsivity?
- c) What is a linearly polarized mode?
- d) What is Rayleigh scattering?
- e) Calculate the bandgap energy for an LED to emit 850nm.
- f) What is fiber alignment?
- g) Describe the term Quantum Limit?
- h) What is dark current?
- i) For $n_1 = 1.55$ and $n_2 = 1.52$, calculate the critical angle and numerical aperture?
- j) Compare and contrast between surface and edge emitting LEDs.

SECTION-B

(4x5=20)

Q.2. Explain the structure of single mode and multimode step index and graded index optical fibers with cross section and ray path?

Q.3. Explain the different types of bending losses in optical fiber?

Q.4. Explain the error sources of fundamental receiver operates. Discuss the performance of digital receiver?

- Q.5. What are the advantages of optical fiber communication? Describe the noise effects on the optical receiver performance?
- Q.6. Explain the implementation of a typical WDM- network containing various types of optical amplifiers?

SECTION-C

(2x10=20)

- Q.7. Discuss the LASER diode principle, modes and threshold conditions? Draw the schematics of PIN photodiode and explain in detail?
- Q.8. Write short note on:
- (a) Fiber splices
 - (b) Fiber connectors
 - (c) Fiber refractive index profile measurement
- Q.9. Draw the front end optical amplifiers and explain? Draw the structure and electric fields in the APD and explain its working?

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