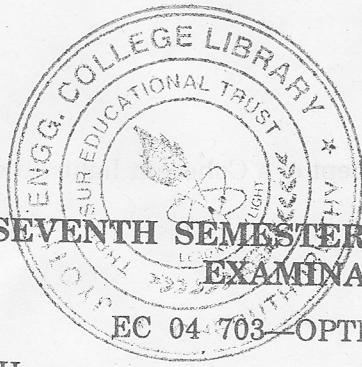


D 23137



(Pages : 2)

Name.....

Reg. No.....

**SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE  
EXAMINATION, DECEMBER 2011**

**EC 04 703—OPTICAL COMMUNICATION SYSTEM**

Time : Three Hours

Maximum : 100 Marks

*Answer all questions.*

- I. (a) With the cross-sectional views of the transverse electric field vectors for the four lowest-order modes in a step-index fibers.
- (b) What is Numerical Aperture (NA) ? Briefly explain.
- (c) For GaAs at 300 K,

Electron rest mass  $m = 9.11 \times 10^{-31} \text{ kg.}$

Effective electron mass  $m_e = 0.068 m.$   
 $= 6.19 \times 10^{-32} \text{ kg.}$

Effective hole mass  $m_h = 0.56 m.$   
 $= 5.10 \times 10^{-31} \text{ kg.}$

Band-gap energy  $E_g = 1.42 \text{ eV}$

Calculate the intrinsic carrier Concentration  $x_i$ .

- (d) Define Responsivity and Sensitivity.
- (e) Write short note on Shot noise.
- (f) Briefly describe the non-linear effects in fiber propagation.
- (g) Briefly explain Raman amplifier.
- (h) What is saturation induced cross talk ?

(8 × 5 = 40 marks)

II. (a) (i) Explain in detail about dispersion in single mode fibers.

(8 marks)

(ii) Write a short note on mode Coupling.

(7 marks)

*Or*

(b) What are the losses in optical fibers ? Explain them in detail.

III. (a) Explain the modulation Capability and transient response.

*Or*

(b) Discuss in detail about the various laser diode structures, their principle of operation and radiation patterns.

Turn over

IV. (a) With block diagram, explain the fundamental Concept of a Coherent lightwave system.

Or

(b) Derive an expression for the BER of :

(i) OOK Homodyne system.

(7 marks)

(ii) PSK Homodyne system.

(8 marks)

V. (a) Explain in detail about Kerr effect, Porillouin Scattering and their applications.

Or

(b) Explain in detail about :

(i) Semiconductor amplifier.

(7 marks)

(ii) Erbium doped fiber amplifier.

(8 marks)

[4 × 15 = 60 marks]