

Code: R7 420401

R7

B.Tech IV Year II Semester (R07) Advanced Supplementary Examinations, June 2012

OPTICAL COMMUNICATIONS

(Electronics and Communication Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE questions
All questions carry equal marks

- 1 (a) Draw the optical fiber communication block diagram and explain each in detail.
(b) Explain the following: (i) Total internal reflection. (ii) Acceptance angle.
(iii) Critical angle. (iv) Numerical aperture.
- 2 (a) With neat diagrams explain the light propagation conditions in single mode fibers.
(b) Explain the losses in fiber optic communications.
- 3 (a) Explain about material and wave guide dispersions.
(b) Determine the received pulse width and approximate bit rate of the fiber if the transmitted pulse width of 0.5 nsec of a single mode fiber operating at a wave length 1.3 μm , material dispersion 2.81 nsec and wave guide dispersion 0.495 nsec.
- 4 (a) Explain about fiber splicing techniques.
(b) Explain with neat diagrams of LASER and its principle.
- 5 What are the different source to fibre power coupling techniques explain any one in detail. How will you improve coupling efficiency?
- 6 (a) Explain fundamental principle of APD detector with neat diagrams.
(b) Derive an expression for total mean square noise signal in a photo detector and hence the S/N ratio at the output of a receiver.
- 7 (a) What are the different system considerations in the design of a fiber optic link?
(b) Determine the rise times for various components of intensity modulated fiber optic link are listed below, these specifications support a 5 km repeater less fiber optic link with optical band width 6 MHz.
Rise time of LED transmitter electronics = 10 nsec.
Inter modal dispersion induced = 8 nsec/km.
Intra modal dispersion induced = 2 nsec/km.
Rise time of detector and receiver electronic = 3 nsec.
- 8 (a) Explain the requirements and merits of line coding in optical communication systems.
(b) Explain the attenuation measurement using cut-back method.
