Code: 13A04702 **R13**

B.Tech IV Year I Semester (R13) Supplementary Examinations June 2018

OPTICAL FIBER COMMUNICATION

(Electronics & Communication Engineering)

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory Question)

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1 Answer the following: (10 X 02 = 20 Marks)

(a) Define Snell's law.
(b) What is graded-index numerical aperture?
(c) Write short notes on core and cladding losses.
(d) Define intermodal distortion.
(e) Calculate the wavelength λ in micrometers for the band gap energy E_g of 2 eV.
(f) What is fiber splicing? What are splicing techniques?
(g) Define photo detector noise.
(h) Write short notes on probability of error and quantum limit.
(i) What is rise time budget?
(j) A digital fiber link operating at 1200 nm requires a BER of 10^{-6}. Calculate quantum limit in terms of quantum efficiency.

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

2 Write in brief about optical fiber modes and configurations.

OR

3 Differentiate single mode fiber and graded index fiber. Explain propagation modes in single mode fibers.

UNIT – II

4 Discuss the following for optical fibers:
(i) Scattering loss.
(ii) Waveguide dispersion.

OR

5 Explain in detail about the pulse broadening in graded index fibers.

UNIT – III

6 Explain in detail about laser diode modes and threshold conditions.

OR

7 Write in brief about:
(i) Non imaging microsphere.
(ii) Laser diode to fiber coupling.

UNIT – IV

8 What is an avalanche photodiode? What are the differences between APDs and PIN devices?

OR

9 With a schematic diagram, explain the working of optical receiver.

UNIT – V

10 Explain the optical power loss model for a point to point link and discuss link power budget.

OR

11 Explain the following:
(i) Relative intensity noise in digital systems.
(ii) Receiver sensitivity in digital systems.

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