

**B. TECH. (CBCS - 2014 COURSE) SEM -VIII (E & TC ENGG.)
: SUMMER - 2018**

SUBJECT: OPTICAL FIBER COMMUNICATION

Day: **Saturday**
Date: **02/06/2018**

S-2018-4723

Time: **02.30 PM TO 05.30 PM**
Max. Marks: 60

N.B:

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.

Q.1 a) What is mode? Explain TE modes of a symmetric step-index planar waveguide. (05)

b) A step index fiber has an acceptance angle of 20° in air and a relative index difference of 3%. Estimate the NA and the critical angle at the core cladding interface. (05)

OR

Q.1 a) How is the ray propagating in Graded index fiber? Explain it with neat and clean diagram. (05)

b) What is the difference between phase velocity and group velocity? (05)

Q.2 a) What is the working principle of optoelectronics detector? (05)

b) What is the external quantum efficiency of an LED? (05)

OR

Q.2 a) What is the condition of laser action and characteristic of LASER? (05)

b) Photons of wavelength $0.9\mu\text{m}$ are incident on a pn-photodiode at a rate of $5 \times 10^{10} \text{s}^{-1}$ and on an average the electrons are collected at the terminals of the diode at the rate of $2 \times 10^{10} \text{s}^{-1}$. Calculate the quantum efficiency and the responsivity of the diode at this wavelength. (05)

Q.3 a) What do you mean by connection losses due to intrinsic parameter? (05)

b) What are the types of fiber splices? Explain it. (05)

OR

Q.3 a) Distinguish between a splice and a connector. How can one avoid or reduce loss due to Fresnel reflection at a joint? (05)

b) What is optical coupler? (05)

Q.4 a) What is meant by OTDR? Discuss with the aid of a diagram, how this method may be used in field measurements? (05)

b) What are the different types of noise sources in optical communication? (05)

OR

Q.4 a) How is the dispersion in optical fiber measured? (06)

b) What is quantum limit? (04)

Q.5 a) Explain the basic optical fiber network topologies. (05)

b) Explain transmission formats and speeds of SONET/SDH. (05)

OR

Q.5 a) Write short note on stimulated Raman Scattering. (05)

b) What is WDM network? (05)

Q.6 a) Explain optical switching? (05)

b) What is Add/Drop multiplexing? (05)

OR

Q.6 a) What is optical CDMA? (05)

b) Explain the performance of WDM with EDFA system. (05)