

Code No: **R41041****R10****Set No. 1****IV B.Tech I Semester Supplementary Examinations, Mar/April - 2016****OPTICAL COMMUNICATIONS****(Electronics and Communication Engineering)****Time: 3 hours****Max. Marks: 75****Answer any FIVE Questions****All Questions carry equal marks***********

- 1 a) Draw the electromagnetic spectrum, explain different ranges and their wavelengths. Clearly show the range of wavelengths used for optical fiber communication.
b) Derive the Numerical Aperture of a step index fiber (SIF) from Snell's law.
- 2 Explain all four types of distortion mechanisms in optical communication.
- 3 a) Explain the material dispersion in optical wave guides
b) Glass fiber exhibits material dispersion given by $\lambda^2(d^2n_1/d\lambda^2)$ of 0.025. Determine material dispersion parameter at a wavelength of 0.85 μ m and estimate rms pulse broadening/km for good LED source with an rms spectral width of 20 nm at this wavelength.
- 4 a) Explain briefly about LED structures.
b) Derive laser diode rate equation.
- 5 a) Draw and explain the output patterns of source to fiber power launching.
b) What is equilibrium numerical aperture?
- 6 a) The quantum efficiency of an InGaAs PIN diode is 80% in the wave length range between 1300nm and 1600nm. Compute the range of responsivity of the PIN diode in the specified wavelength range.
b) Differentiate between the photo diode parameters, 'Quantum limit' and 'Dark current'
- 7 a) Discuss about the point to point fiber optic link and its characteristics with an example.
b) Explain about the frequency chirping and its effects.
- 8 a) What are the advantages of the WDM?
b) Explain how the attenuation does and dispersion is measured in optical communication.