

**B. TECH. (CBCS - 2014 COURSE) SEM - VIII (ELECTRONICS)
: SUMMER - 2018**

SUBJECT: OPTICAL FIBER COMMUNICATION

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

S-2018-4681

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.
- 3) Assume suitable data if necessary.
- 4) Use of non-programmable **CALCULATOR** is allowed.

Q.1 With schematic diagram explain the 'Outside Vapour-Phase Oxidation' process for the preparation of optical fiber. **(10)**

OR

- Q.1 a)** Determine the cut off wavelength for a step index fiber to exhibit single-mode operation when the core refractive index and radius are 1.46 and 4.5 μ m respectively, with the relative index difference being 0.25% (Given : $V_C = 2.405$, cut – off normalized frequency for step index fiber) **(06)**
- b)** Write a note on: 'Dispersion'. **(04)**

Q.2 Compare 'LED' and 'Injection Laser' in detail. **(10)**

OR

- Q.2 a)** Describe LED drive circuits and Laser derive circuits for optical signal transmission. **(06)**
- b)** Explain stimulated emission and lasing in semiconductor. **(04)**

Q.3 Define : i) Quantum efficiency
ii) Responsivity **(10)**

When 3×10^{11} photons each with a wavelength of 0.85 μ m are incident on a photodiode, on average 1.2×10^{11} electrons are collected at the terminal of the device. Determine the quantum efficiency and the responsivity of the photodiode at 0.85 μ m.

OR

- Q.3 a)** Explain detection process in p-n photodiode. **(06)**
- b)** Explain 'Link power budget'. **(04)**

Q.4 Describe WDM (Wavelength Division Multiplexing) in optical fiber system. **(10)**

OR

- Q.4 a)** Describe optical Time division multiplexing. **(06)**
- b)** Describe working of optical amplifier. **(04)**

Q.5 Describe optical couplers and Isolator in detail. **(10)**

OR

- Q.5 a)** List the types of fiber connectors & explain any one in detail. **(06)**
- b)** Write applications & advantages of SONET. **(04)**

Q.6 Draw & explain the measurement of scattering loss in optical fiber. **(10)**

OR

- Q.6 a)** Explain numerical aperture measurement using scanning photodetector and rotating stage. **(06)**
- b)** Write Industrial & military applications of optical communication. **(04)**

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