CBCS SCHEME

USN | | | | | | | | | | |

18EC824

Eighth Semester B.E./B.Tech. Degree Examination, June/July 2025
Optical Communication Networks

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-1

1 a. Explain digital optical fiber link using semiconductor laser source and an avalanche photodiade (APD) detector. **(06 Marks)**

b. State advantages of optical fiber communication system. **(04 Marks)**

c. Derive conditions for numerical apature of step index fiber for Meridional ray. **(10 Marks)**

OR

2 a. A silica optical fiber with a core diameter large enough to be considered by ray theory analysis has a core refractive index of 1.50 and a cladding refractive index of 1.47. Determine :
i) Critical angle at the core – cladding interface
ii) NA for the fiber
iii) Acceptance angle in air for the fiber. **(06 Marks)**

b. Explain :
i) Mode field diameter
ii) Cutoff wavelength. **(10 Marks)**

c. Write short notes on step index fiber. **(04 Marks)**

Module-2

3 a. Explain material absorption losses in silica glass fiber. **(10 Marks)**

b. Explain the structure of basic cylindrical ferrule connector. **(10 Marks)**

OR

4 a. Explain :
i) Rayleigh scattering
ii) Mie scattering. **(10 Marks)**

b. Explain :
i) Star coupler
ii) Optical isolator. **(10 Marks)**

Module-3

5 a. With the help of neat diagram explain surface emitting LED. **(10 Marks)**

b. Explain :
i) PIN photo detector
ii) Avalanche photodiodes. **(10 Marks)**

OR

6 a. With the help of neat diagram, explain Fabry – Perot resonator cavity for a laser diode. **(10 Marks)**

b. Explain Noise sources and disturbances in an optical pulse detection mechanism. **(10 Marks)**

Module-4

7 a. With the help of neat diagram explain operational principle OS WDM. **(10 Marks)**

b. Illustrate the working of Erbium – Doped fiber amplifier amplification mechanism. **(10 Marks)**

OR

8 a. State and explain basic applications of optical amplifiers. **(10 Marks)**

b. Explain :
i) Dielectric their flim filter
ii) EDFA co-directional pumping architecture. **(10 Marks)**

Module-5

9 a. Explain public telecommunication networks overview. **(10 Marks)**

b. Explain waveband switching networks architecture employing a multigranular optical cross connect (MG – OXC). **(10 Marks)**

OR

10 a. Explain :
i) Optical circuit switched network
ii) Optical packet switched network. **(10 Marks)**

b. Explain :
i) STS – 1 Frame structure
ii) Optical cross – connect (OXC). **(10 Marks)**

* * * * *

CMRIT LIBRARY
BANGALORE - 560 037