



CBCS SCHEME

21EC72

Seventh Semester B.E./B.Tech. Degree Examination, June/July 2026 Optical and Wireless Communication

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- 1 a. What is Optical Fiber Communication? With necessary equation explain Snell's law and Critical angle. (07 Marks)
- b. Suppose we have a multimode step index optical fiber that has a core radius of 25 μm , a core index of 1.48 and index difference $\Delta = 0.01$. What are the number of modes in the fiber at wavelengths 860, 1310 and 1550 nm? (06 Marks)
- c. Explain the different types of signal dispersion in fibers. (07 Marks)

OR

- 2 a. Define Single Mode Fibers. Explain the propagation modes in single mode fiber. (07 Marks)
- b. Consider a two silica fibers that are doped with 6 percent and 18 percent mole fractions of GeO_2 respectively. Compare the ultraviolet absorptions at wavelength of 0.7 μm and 1.3 μm . (06 Marks)
- c. Explain the following with necessary equations:
(i) Scattering losses
(ii) Attenuation
(iii) Bending losses (07 Marks)

Module-2

- 3 a. With neat sketches explain the LED structure and its working. (10 Marks)
- b. What is WDM? Explain the typical WDM networks. (10 Marks)

OR

- 4 a. Derive the Laser Diode Equations, Quantum efficiency and Resonant frequencies. (10 Marks)
- b. Define Diffraction Gratings. With equations and diagram explain the diffraction gratings. (10 Marks)

Module-3

- 5 a. Explain the basic signal propagation mechanisms. (10 Marks)
- b. With suitable diagram explain the cell structure and cluster. (10 Marks)

OR

- 6 a. Briefly explain the Fading and Multipath Fading. (10 Marks)
- b. What is Reuse Distance? Explain Frequency Reuse Distance. (10 Marks)

Module-4

- 7 a. With a diagram explain the technique of Frequency Division Multiple Access (FDMA). (10 Marks)
- b. Explain the steps for mobile originated calls. (10 Marks)

OR

- 8 a. Explain the Basic TDMA communication link with block diagram. (10 Marks)
- b. Explain Hybrid Multiple Access Techniques. (10 Marks)

Module-5

- 9 a. With neat architecture explain the GSM Network. (10 Marks)
- b. In detail explain the GSM hand-off procedures. (10 Marks)

OR

- 10 a. Explain the frame structure of GSM. (10 Marks)
- b. Briefly explain the authentication and security in GSM. (10 Marks)

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