PCET LIBRARY BANGALORE-49

CBCS SCHEME

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

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.

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. 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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