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MTECH
(SEM I) THEORY EXAMINATION 2024-25
OPTICAL COMMUNICATION

TIME: 3 HRS

M.MARKS: 70

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt all questions in brief. 2 x 7 = 14

a.	Define phase shift keying (PSK).
b.	Name two modulation schemes used in coherent optical systems.
c.	What is the key difference between SOA and EDFA?
d.	What is the role of a multiplexer in WDM systems?
e.	What is a storage area network (SAN)?
f.	Enlist the benefits of using wavelength-routed networks.
g.	What is the typical application of high-speed soliton communication systems?

SECTION B

2. Attempt any three of the following: 7 x 3 = 21

a.	What are coherent optical communication systems? Explain their significance.
b.	Describe the structure and operation of an Erbium-Doped Fiber Amplifier (EDFA).
c.	What is Wavelength Division Multiplexing (WDM)? Discuss its advantages in optical communication systems.
d.	Explain the architecture of SONET/SDH and its importance in optical communication networks.
e.	Explain the working of high-speed soliton systems for optical communication.

SECTION C

3. Attempt any one part of the following: 7 x 1 = 7

(a)	Compare different modulation schemes used in coherent communication systems
(b)	Explain the process of demodulation in coherent systems. How does phase noise affect the performance of coherent systems?

4. Attempt any one part of the following: 7 x 1 = 7

(a)	Discuss the role of high-power fiber amplifiers in digital optical transmission systems.
(b)	Compare EDFA and Raman amplifiers in terms of gain, noise figure, and applications.

5. Attempt any one part of the following: 7 x 1 = 7

(a)	Describe Code Division Multiplexing (CDMA) and its implementation in optical systems.
(b)	Explain the multiple access schemes used in optical communication systems, with examples.

6. Attempt any one part of the following: 7 x 1 = 7

(a)	What are storage area networks (SANs)? Discuss their role in modern optical communication systems.
(b)	Explain the concept of wavelength-routed optical networks and their advantages.

7. Attempt any one part of the following: 7 x 1 = 7

(a)	What is dispersion management in soliton systems? Discuss its significance.
(b)	What are solitons in optical fibers? Explain the nonlinear effects leading to their formation.