PAPER ID-411239

Subject Code: MTEC041

Roll No: | | | | | | | | | | | | | |

MTECH
(SEM II) THEORY EXAMINATION 2023-24
ADVANCED OPTICAL NETWORKS

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.	Describe the digital wrapper technology in the context of OTN.
b.	Explain problem detection and concatenation in SONET.
c.	Define metro optical networking.
d.	Explain the role of Erbium-Doped Fiber (EDF) in WDM systems.
e.	Illustrate the concept of label switching in MPLS.
f.	Describe the concept of data-bearing links in LMP.
g.	What is need of optical compilers in optical network?

SECTION B

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

a.	Describe the multiplexing techniques used in OTN. Also explain the optical and digital transport hierarchies in OTN.
b.	Explain the basic principles of WDM and DWDM. Also discuss the advantages of DWDM over traditional WDM in optical communication networks.
c.	Describe the operational principles of MPLS. Also explain the relationship between Optical Cross-Connects (OXCs) and MPLS.
d.	Elaborate on the basic functions of LMP. What are the primary operations performed by LMP to ensure efficient link management?
e.	Describe the key building blocks of optical compilers. Also discuss the role of optical switches, modulators, and detectors in the construction of an optical compiler.

SECTION C

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

(a)	Explain the multiplexing hierarchy used in SONET and SDH. How do these hierarchies facilitate the transmission of data over optical networks?
(b)	Write a short note on (a) Encapsulation & Decapsulation in OTN (b) Generic Framing Procedure (GFP).

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

(a)	Explain the functions of multiplexers and demultiplexers in WDM/DWDM systems. How do they enable efficient use of optical bandwidth?
(b)	Describe the various types of network topologies used in optical communication, such as ring, star, mesh, and bus topologies.

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

(a)	Explain the roles of the three control planes (IP, MPLS, and optical) in modern transport networks. How do they interact to provide end-to-end network services?
(b)	Explain the concept of traffic engineering in MPLS networks. How does MPLS facilitate efficient use of network resources and optimization of traffic flow?

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

(a)	Write a short note on (a) Link Property Correlation (LPC (a) Link Connectivity Verification (LCV).
(b)	Explain the types of messages used in LMP. Also explain the structure and components of an LMP message header.

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

(a)	Discuss various design approaches for optical counters and their advantages and limitations.
(b)	Write a short note on (a) Time Multiplex Multiprocessor (b) Time Slot Interchange with 2 log2(N-1) Switch.

QP24EP2_068 | 16-Aug-2024 1:39:24 PM | 182.79.215.75