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AY 24

Gandhi Institute of Engineering and Technology University, Odisha, Gunupur
(GIET University)

M.Tech. (First Semester – Regular/Supplementary) Examinations, January – 2026

24MECPE11011– Optical Networks

Time: 3 hrs | Maximum: 60 Marks

Answer ALL questions
(The figures in the right hand margin indicate marks)

PART – A **(2 x 5 = 10 Marks)**

Q.1. Answer ALL questions		CO #	Blooms Level
a.	What is a forwarding table? Mention one entry it stores.	CO1	K1
b.	Define ROADM.	CO2	K1
c.	List two common optical link KPIs used for monitoring.	CO3	K1
d.	State one advantage of mesh protection over ring protection.	CO4	K2
e.	Define statistical dimensioning	CO5	K2

PART – B **(10 x 5 = 50 Marks)**

Answer ALL the questions		Marks	CO #	Blooms Level
2. a.	Explain traffic engineering in MPLS and how constraint-based routing supports it.	5	CO1	K4
b.	Discuss common failure scenarios in transport networks and how SONET/SDH alarms support fault localization.	5	CO1	K4
	(OR)			
c.	Explain grooming in SONET/SDH-based metro networks and why it is important for bandwidth utilization.	5	CO1	K3
d.	Design an outline for migrating a legacy SDH ring to an IP/MPLS optical transport network; mention key steps and risks.	5	CO1	K6
3.a.	Discuss ROADM operation using WSS and explain colorless/directionless/ contentionless features (conceptual).	5	CO2	K4
b.	Explain OXC architectures and switching granularity (fiber, wavelength, waveband).	5	CO2	K4
	(OR)			
c.	Describe optical power management in WDM networks and methods to equalize channel power.	5	CO2	K4
d.	Case study: choose suitable node equipment for a metro ring requiring frequent reconfiguration and justify your choice.	5	CO2	K5
4.a.	Explain configuration management tasks for WDM networks (provisioning, inventory, wavelength plan, templates).	5	CO3	K3
b.	Compare centralized vs distributed control in optical networks and discuss trade-offs for scalability and resilience.	5	CO3	K4
	(OR)			
c.	Discuss optical safety procedures for live-fiber testing and connector inspection in operational networks.	5	CO3	K5
d.	Given alarms such as LOS/LOF/high BER, propose a structured fault isolation sequence for a WDM span.	5	CO3	K4

5.a.	Explain optical layer protection schemes: dedicated path protection, shared path protection and span protection.	5	CO4	K3
b.	Compare protection vs restoration with respect to control complexity, recovery speed and capacity overhead.	5	CO4	K5
	(OR)			
c.	Explain mesh-based protection and the concept of p-cycles; justify why p-cycles are attractive.	5	CO4	K4
d.	Design a survivability strategy for a core WDM mesh carrying critical services and justify scheme selection.	5	CO4	K6
6.a.	Discuss the role of wavelength converters and analyze cost vs performance benefits.	5	CO5	K2
b.	Explain dimensioning of wavelength-routed networks and how target blocking guides required wavelengths per link.	5	CO5	K3
	(OR)			
c.	Describe statistical dimensioning models and how offered load and blocking targets determine resource provisioning.	5	CO5	K3
d.	Propose an algorithmic flow (pseudocode-level) for dynamic RWA in a ROADM mesh network.	5	CO5	K2

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