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GANDHI INSTITUTE OF ENGINEERING AND TECHNOLOGY UNIVERSITY, ODISHA, GUNUPUR

(GIET UNIVERSITY)

M.Tech. (First Semester) Regular Examinations, February – 2025

24MECPC11011 –Optical Networks

(ECE)

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 the fundamental principle behind Wavelength Division Multiplexing (WDM)?	CO2	K1
b.	Summarize the importance of optical fiber in communication systems.	CO1	K2
c.	What are the functions of couplers in optical networks?	CO3	K2
d.	Explain why WDM networks are referred to by this name.	CO4	K1
e.	Differentiate between broadcast and switched networks in optical communication.	CO2	K2

PART – B **(10 x 5 = 50 Marks)**

Answer ***ALL*** the questions		Marks	CO #	Blooms Level
2. a.	Discuss the necessity of optical layer protection and outline the different protection schemes used in optical networks.	5	CO1	K4
b.	Explain the key layers in the SONET system, including path, line, section, and physical layers.	5	CO1	K3
	(OR)			
c.	What are the different levels of protection in SONET/SDH networks? Explain their importance.	5	CO1	K2
d.	Compare and contrast circulators and isolators in optical communication technology.	5	CO1	K3
3.a.	What is Wavelength Division Multiplexing (WDM), and why is it important in fiber-optic networks?	5	CO2	K3
b.	How does WDM enhance the transmission capacity of fiber networks? Illustrate with a diagram.	5	CO2	K2
	(OR)			
c.	Explain the fundamental concepts of coherent optical communication and its impact on increasing data transmission rates.	5	CO2	K4
d.	Briefly discuss Light Path Topology Design (LTD) problems and their role in optical network optimization.	5	CO2	K2
4.a.	Analyze the SONET/SDH standards concerning (i) Multiplexing Structure and (ii) Frame Structure.	5	CO3	K2
b.	Describe the primary components of an SDH system and explain their functionalities.	5	CO3	K4
	(OR)			
c.	What is the role of OpenFCP in fiber-optic network management and control?	5	CO3	K2
d.	Summarize the challenges and advancements in coherent optical communication technology.	5	CO3	K3

5.a.	Explain the concepts of Multiplexing and Demultiplexing in Optical Time Division Multiplexing (OTDM).	5	CO4	K4
b.	Describe the process of managing a WDM channel in an Add/Drop Multiplexer (ADM).	5	CO4	K3
	(OR)			
c.	Discuss the revised SDH transport hierarchy with a clearly labeled diagram.	5	CO4	K1
d.	Define Enhanced Hybrid Fiber-Coaxial (HFC) and Fiber-to-the-Curb (FTC) and their applications.	5	CO4	K2
6.a.	Explain the working of Wavelength Routing Passive Optical Networks (PON) with a diagram.	5	CO2	K3
b.	Compare bit-interleaved and packet-interleaved optical time division multiplexing (OTDM).	5	CO1	K3
	(OR)			
c.	Explain the importance of connection management in optical networking.	5	CO1	K1
d.	Describe Bragg Grating technology and illustrate its working with a neat diagram.	5	CO3	K3

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