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**GANDHI INSTITUTE OF ENGINEERING AND TECHNOLOGY UNIVERSITY, ODISHA, GUNUPUR
(GIET UNIVERSITY)**



Time: 3 hrs

M.Tech. (Second Semester) Regular Examinations, May – 2026
**24MECPC12001 - Advanced Communication Systems
(ECE)**

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 Differentiate between lowpass and bandpass signal representations in communication systems.	CO1	K2
b What is meant by signal space representation of waveforms? Explain in brief.	CO1	K1
c Define memory-based modulation schemes. Mention two examples.	CO2	K1
d Explain the concept of Time Division Multiplexing (TDM) and state its application in advanced communication networks.	CO3	K2
e Name any two multiple access techniques used in satellite communication and explain one briefly.	CO4	K1

PART – B**(10 x 5 = 50 Marks)**Answer **ALL** the questions

	Marks	CO #	Blooms Level
2.a Describe the process of Gram-Schmidt Orthogonalization and its role in signal space representation.	5	CO1	K3
b Elaborate the key blocks and data flow in a typical digital communication system with suitable examples.	5	CO1	K4
(OR)			
c Discuss matched filter detection and derive the expression for maximum SNR.	5	CO1	K4
d Explain the significance of Eye Diagram in digital communication and its application in analyzing signal quality.	5	CO1	K3
3.a Provide a detailed explanation of memoryless modulation schemes such as ASK, FSK, and PSK.	5	CO2	K5
b Illustrate and compare BPSK and QPSK modulation schemes with constellation diagrams.	5	CO2	K3
(OR)			
c Describe M-ary modulation schemes and the trade-off between bandwidth and error performance.	5	CO2	K4
d Explain the role and benefits of spread spectrum modulation techniques in secure communication.	5	CO2	K4
4.a Discuss the evolution of telecommunication networks from analog systems to modern optical fiber systems.	5	CO3	K3
b Explain the architecture and key components of Optical Transport Networks (OTN).	5	CO3	K4

(OR)

c	Analyze Wavelength Division Multiplexing (WDM) and Time Division Multiplexing (TDM) techniques in telecom infrastructure.	5	CO3	K4
d	Compare synchronous and asynchronous transmission, highlighting advantages and suitable applications.	5	CO3	K2
5.a	Compare FDMA, TDMA, and CDMA multiple access techniques used in satellite communication.	5	CO4	K5
b	Explain the steps involved in satellite link design to achieve a desired Carrier-to-Noise Ratio (C/N).	5	CO4	K3
(OR)				
c	Describe different switching techniques used in telecommunication networks.	5	CO4	K4
d	Discuss the significance of soft handoff and hard handoff in mobile communication networks.	5	CO4	K3
6.a	Provide a comprehensive overview of GSM architecture, detailing the role of each subsystem.	5	CO2	K4
b	Explain the evolution and major milestones in the development of mobile telephone systems from 1G to 5G.	5	CO2	K3
(OR)				
c	Describe the concept of software-defined radio (SDR) and its applications in flexible communication systems.	5	CO4	K4
d	Examine the importance of system noise temperature and G/T ratio in satellite link budget analysis.	5	CO4	K3

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