Reg. No.															

Question Paper Code	14143

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2025

Fourth Semester

Computer and Communication Engineering

20CCPC401 - ANALOG AND DIGITAL COMMUNICATION

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	The main purpose of modulation in communication systems is to (a) Reduce interference (b) multiplexing (c) Reduce antenna height (d) all the above	1	K1	CO1
2.	The fundamental components of data communication are: (a) Transmitter, receiver, channel (b) Transmitter, receiver, channel, message (c) Transmitter, receiver, channel, message, protocol (d) Transmitter and receiver	1	K1	CO1
3.	The intermediate frequency (IF) used in AM broadcast receivers is typically (a) 10 MHz (b) 455 kHz (c) 100 kHz (d) 1 MHz	1	K1	CO2
4.	The function of a limiter in FM receiver is to (a) Eliminate amplitude variations (b) Reduce frequency variations (c) Filter noise (d) Mix signals	1	K1	CO2
5.	Sampling is the process of (a) Converting analog signal to binary (b) Measuring the signal at discrete intervals (c) Encoding the signal (d) Quantizing the signal	1	K1	CO3
6.	The signal-to-quantization noise ratio (SQNR) in PCM increases with (a) Decrease in bits/sample (b) Increase in bits/sample (c) Sampling rate (d) Decrease in bandwidth	1	K1	CO3
7.	The probability of error in digital modulation depends on (a) Signal energy (b) Noise power (c) Both (d) None	1	K1	CO4
8.	Bit Error Rate (BER) is defined as (a) Ratio of bits received to bits transmitted (b) Fraction of bits received incorrectly (c) Number of bits per second (d) Power ratio	1	K1	CO4
9.	The mutual information between input X and output Y of a channel is given by (a) H(X) – H(Y) (b) H(X) + H(Y) (c) H(X) – H(X|Y) (d) H(Y) – H(X|Y)	1	K1	CO5
10.	The basic principle of OFDM is (a) Frequency division using orthogonal subcarriers (b) Time division multiplexing (c) Code spreading (d) None	1	K1	CO6

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

		Marks	K – Level	CO
11.	Differentiate amplitude and frequency Modulation.	2	K2	CO1
12.	List the types of analog modulation techniques.	2	K1	CO1
13.	Define modulation Index.	2	K1	CO2
14.	State the purpose of an RF amplifier in a receiver.	2	K1	CO2
15.	Mention the purpose of a line coding scheme.	2	K1	CO3
16.	Define μ-law and A-law companding.	2	K1	CO3
17.	Distinguish between QPSK and 8-PSK.	2	K2	CO4
18.	Define on–Off Keying.	2	K1	CO4

19.	State channel coding theorem.		*2*	*K1*	*CO5*
20.	List the properties of cyclic codes.		*2*	*K1*	*CO5*
21.	Differentiate GSM over CDMA.		*2*	*K2*	*CO6*
22.	Mention the purpose of GPRS in mobile networks.		*2*	*K1*	*CO6*

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	With neat block diagram, explain the function of each block in a super heterodyne receiver.	*11*	*K2*	*CO1*
		OR			
	b)	Explain the principle of AM modulation with mathematical analysis. Draw the AM wave and explain its power distribution.	*11*	*K2*	*CO1*
24.	a)	Draw the block diagram of Armstrong indirect FM transmitter and describe its operation.	*11*	*K2*	*CO2*
		OR			
	b)	Discuss the operation of pre-emphasis and de-emphasis in the FM communication System.	*11*	*K2*	*CO2*
25.	a)	Illustrate the principle of generation and demodulation of PPM with block diagram.	*11*	*K2*	*CO3*
		OR			
	b)	With a neat block diagram, explain the operation of adaptive Delta modulation.	*11*	*K2*	*CO3*
26.	a)	Describe the generation and detection of binary FSK signal with necessary diagram and equation.	*11*	*K3*	*CO4*
		OR			
	b)	Discuss the working of Quadrature Amplitude Modulation (QAM) and show its signal constellation.	*11*	*K3*	*CO4*
27.	a)	Encode the following source using Shannon-Fano technique. Find the coding efficiency P[X] = [0.48 0.15 0.10 0.10 0.07 0.05 0.03 0.02].	*11*	*K3*	*CO5*
		OR			
	b)	Explain the operation of Viterbi decoding algorithm for convolutional codes. Make suitable assumptions.	*11*	*K3*	*CO5*
28.	a)	Summarize the concept of multiple access and compare FDMA, TDMA, and CDMA techniques.	*11*	*K2*	*CO6*
		OR			
	b)	Discuss the working principle, architecture, and features of Bluetooth technology.	*11*	*K2*	*CO6*