Reg. No.															

Question Paper Code	14754

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2026

Fourth Semester

Electronics and Instrumentation Engineering

20EIPC402 - PRINCIPLES OF COMMUNICATION ENGINEERING

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART – A (i) (MCQ)
(16 × 1 = 16 Marks)

		Marks	K – Level	CO
	Answer ALL Questions			
1.	Define the parameter that is modulated in Amplitude Modulation (AM) a) Frequency of the carrier b) Amplitude of the carrier c) Phase of the carrier d) Frequency and phase of the carrier	1	K1	CO1
2.	Identify what happens to the carrier in Double Sideband Suppressed Carrier (DSBSC) modulation a) Amplified b) Suppressed c) Modulated d) Transmitted with the sidebands	1	K3	CO1
3.	Show the main advantage of Single Sideband Suppressed Carrier (SSBSC) over DSBSC a) Increased bandwidth b) Reduced power consumption c) Reduced bandwidth and power d) Increased complexity	1	K2	CO1
4.	Find the condition stated by the Nyquist sampling theorem regarding the sampling rate a) Greater than twice the maximum frequency of the signal b) Equal to the maximum frequency of the signal c) Less than twice the maximum frequency of the signal d) None of the above	1	K1	CO2
5.	Select what quantization in Pulse Code Modulation (PCM) refers to a) Reducing the signal bandwidth b) Assigning discrete values to the sampled signal amplitude c) Sampling the signal at regular intervals d) Modulating the signal's frequency	1	K3	CO2
6.	_____ the amplitude of the pulse is proportional to in Pulse Amplitude Modulation (PAM) a) Signal frequency b) Signal phase c) Amplitude of the modulating signal d) Time duration of the pulse	1	K2	CO2
7.	Identify the types of Phase Shift Keying (PSK) a) ASK, FSK, PSK b) BPSK, DPSK, QPSK c) FSK, QAM, BPSK d) QAM, DPSK, PCM	1	K3	CO3
8.	Find the primary use of equalizers a) Remove ISI b) Increase signal power c) Encode signals d) Reduce bandwidth	1	K1	CO3
9.	Outline the steps involved in BPSK modulation: a) Vary the signal frequency b) Vary the signal phase based on binary data c) Vary the signal amplitude based on binary data d) Combine amplitude and frequency modulation	1	K2	CO3
10.	Entropy measures in information theory is _____. a) Signal power b) Uncertainty or randomness of information c) Bandwidth d) Error rate	1	K1	CO4

11.	Where Shannon's source coding theorem relates to a) Signal modulation b) Minimum average length of encoded data c) Noise suppression d) Signal filtering	*1*	*K2*	*CO4*
12.	Identify the type of coding Huffman coding represents a) Error correction code b) Lossless data compression c) Error detection code d) Line coding	*1*	*K3*	*CO4*
13.	Define the purpose of PN sequences in spread spectrum systems a) Error detection b) Spreading the signal c) Compression d) Modulation	*1*	*K1*	*CO5*
14.	Relate what is used to spread the signal in Direct Sequence Spread Spectrum (DSSS) a) Frequency hopping b) Pseudo-noise (PN) sequence c) Amplitude modulation d) Pulse coding	*1*	*K2*	*CO5*
15.	_____ is the technique used in CDMA for multiple access a) Frequency hopping b) Code assignment c) Time slots d) Signal compression	*1*	*K3*	*CO5*
16.	Identify the technique involved in Frequency Hopping Spread Spectrum (FHSS) a) Changing the phase of the signal b) Switching between different frequencies c) Modulating signal amplitude d) Reducing the bandwidth	*1*	*K3*	*CO5*

PART – A (ii) (Short Answer Questions)
(8 × 3 = 24 Marks)
Answer ALL Questions

17.	Apply the AM modulated waveform for a modulation index of 0.5 and interpret its modulation characteristics.	*3*	*K3*	*CO1*
18.	Distinguish between Narrowband Frequency Modulation (NBFM) and Wideband Frequency Modulation (WBFM) in terms of bandwidth, modulation index, frequency deviation, and applications.	*3*	*K4*	*CO1*
19.	Recall and select the Sampling Theorem for a band-limited signal of finite energy.	*3*	*K3*	*CO2*
20.	Analyze the methods used to reduce granular noise in Delta Modulation and evaluate their effect on system performance.	*3*	*K4*	*CO2*
21.	Construct the ASK waveform for the given binary data sequence 1101011 and illustrate its signal representation.	*3*	*K3*	*CO3*
22.	Distinguish between lossless and lossy coding.	*3*	*K4*	*CO4*
23.	Identify hamming distance for the code words 11100 and 11011.	*3*	*K3*	*CO4*
24.	Solve the Near–Far Problem in Code Division Multiple Access (CDMA) systems with suitable illustration.	*3*	*K3*	*CO5*

PART - B (Descriptive Answer Questions)
(5 × 12 = 60 Marks)
Answer ALL Questions

25.	a)	Construct and explain in detail about FM generation using indirect method.	*12*	*K3*	*CO1*
		OR			
	b)	Build with the help of neat diagram, explain the generation of VSB transmission. Draw VSB spectrum and explain the significance.	*12*	*K3*	*CO1*
26.	a)	Construct with the neat diagram Pulse Code Modulation (PCM) transmitter and receiver.	*12*	*K3*	*CO2*
		OR			
	b)	Build the block diagram of the Differential Pulse Code Modulation (DPCM) system and describe the working principle of the DPCM transmitter and receiver.	*12*	*K3*	*CO2*

27.	a)	Construct the operation of a QPSK modulator and demodulator with neat diagrams, and with the corresponding phasor and constellation diagrams.	*12*	*K3*	*CO3*
		OR			
	b)	Make use of a truth table, phasor diagram, and constellation diagram to explain the working of 8-QAM.	*12*	*K3*	*CO3*
28.	a)	Analyze Huffman code to encode the following symbol, S= {0.3,0.2,0.25,0.12,0.05,0.08}, Inspect (i) Average code word length (ii) entropy of the source (iii) code efficiency (iv) redundancy.	*12*	*K4*	*CO4*
		OR			
	b)	Assume five source messages are probable to appear as m1= 0.4, m2 = 0.15, m3 = 0.15, m4 = 0.15 and m5 = 0.15. Examine coding efficiency for Shannon Fano coding.	*12*	*K4*	*CO4*
29.	a)	Classify the working principles of FDMA, TDMA, CDMA, in wireless communications.	*12*	*K4*	*CO5*
		OR			
	b)	Examine the operational principle of the Direct Sequence Spread Spectrum communication system with suitable diagrams and analyze its advantages in wireless communication.	*12*	*K4*	*CO5*