Reg. No.															

Question Paper Code	13469

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2025

Fourth Semester

Electronics and Communication Engineering

20ECPC401 - COMMUNICATION THEORY

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	Modulation system used for video modulation in TV transmission is (a) DSB (b) SSB (c) VSB (d) SSBBC	1	K1	CO1
2.	An AM transmitter is coupled to an aerial. The input current is found to be 5A. With modulation the current value increases to 5.9 A. The depth of modulation is (a) 83.4% (b) 88.6% (c) 78.2% (d) 74.3%	1	K2	CO1
3.	If a frequency modulation signal is represented by- V(t) = 10sin (5 x 10^9t + 3.5sin 1500t) Then modulation index is (a) 3.5 (b) 2.5 (c) 1.5 (d) 0.5	1	K2	CO2
4.	If a radio receiver amplifies all the signal frequency equally well, it is said to have high (a) Fidelity (b) Sensitivity (c) Selectivity (d) Distortion	1	K1	CO2
5.	Consider the two statements: 1) If X and Y are independent random variables, then X and Y are uncorrelated. 2) If random variables X and Y are uncorrelated, then X and Y are independent. Which of the following is true? (a) Only 1 (b) Only 2 (c) Both are true (d) Two are unrelated	1	K2	CO3
6.	If a random process X(t) is ergodic then, statistical averages, (a) time averages are different (b) time averages are same (c) are greater than time averages (d) are smaller than time averages	1	K2	CO3
7.	A system has a receiver noise resistance of 50 Ohm. It is connected to an antenna with an input resistance of 50 Ohm. Calculate the noise figure of the system. (a) 1 (b) 2 (c) 3 (d) 4	1	K2	CO4
8.	Pre-emphasis is done in FM broadcasting to (a) improve signal to noise ratio (b) reduce the transmission power required (c) improve bandwidth utilization (d) modulate signals at higher frequencies	1	K2	CO4
9.	What is the value of minimum sampling frequency of a signal passed through an LPF with cut-off frequency 20 kHz? (a) 20 kHz (b) 30 kHz (c) 40 kHz (d) 50 kHz	1	K1	CO5
10.	Quantizing noise occurs in (a) PCM (b) TDM (c) FDM (d) PPM	1	K1	CO6

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

		Marks	K – Level	CO
11.	A transmitter supplies 10 KW to the antenna when modulated. Determine the total power radiated when modulated to 50%.	2	K2	CO1
12.	What are the advantages of superheterodyne receiver? What are the causes of linear distortion?	2	K1	CO1
13.	How is the narrow band FM converted into wideband FM?	2	K1	CO2
14.	What are the applications of PLL?	2	K1	CO2
15.	Define a random variable.	2	K1	CO3
16.	Define ergodic process.	2	K1	CO3

17.	Define noise equivalent bandwidth.	*2*	*K1*	*CO4*
18.	Define pre-emphasis and de-emphasis.	*2*	*K1*	*CO4*
19.	Compare uniform and non-uniform quantization.	*2*	*K2*	*CO5*
20.	How is PDM wave converted into PPM message?	*2*	*K1*	*CO5*
21.	Draw the typical digital communication system.	*2*	*K1*	*CO6*
22.	What are the corrective measures taken to avoid aliasing effect?	*2*	*K1*	*CO6*

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	Draw the block diagram for the generation & demodulation of a VSB signal & explain the principle of operation.	*11*	*K2*	*CO1*
		OR			
	b)	Draw the block diagram of super heterodyne receiver and explain its operation. Explain the function of each block.	*11*	*K2*	*CO1*
24.	a)	With a neat diagram, Explain Armstrong method generating FM Signal.	*11*	*K2*	*CO2*
		OR			
	b)	With a phasor representation. Explains the working of Foster Seeley discriminator.	*11*	*K2*	*CO2*
25.	a)	Define the following terms random variable, mean, correlation. covariance and ergodicity.	*11*	*K2*	*CO3*
		OR			
	b)	Explain in detail the transmission of random process through a linear time invariant filter.	*11*	*K2*	*CO3*
26.	a)	Define Narrow Band Noise and explain the representation of Narrow Band Noise in terms of In Phase and Quadrature components.	*11*	*K2*	*CO4*
		OR			
	b)	Explain Pre-emphasis and De-emphasis in FM system.	*11*	*K2*	*CO4*
27.	a)	State and prove the sampling theorem for low pass signals and explain the reconstruction of the signal from its samples.	*11*	*K2*	*CO5*
		OR			
	b)	Derive the expression for quantization noise of a PCM system with uniform quantizer. Explain how it can be improved.	*11*	*K2*	*CO5*
28.	a)	The signal $x(t) = 4\cos 400\pi t + 12\cos 360\pi t$ is ideally sampled at a frequency of 300 samples per second. The sampled signal is passed through a unit gain LPF with a cut off frequency of 220Hz. List the frequency components present at the output of the LPF.	*11*	*K2*	*CO6*
		OR			
	b)	A signal is sampled at Nyquist rate of 8 kHz and is quantized using 8-bit uniform quantizer. Assuming SNRq for a sinusoidal signal, calculate the bit rate, SNRq and BW.	*11*	*K2*	*CO6*