fImportant Note: 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.

17EC44

Fourth Semester B.E. Degree Examination, June/July 2023

Principle of Communication System

Time: Char &

Max. Marks: 100

Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- a. Explain the generation of AM waves using square Law modulator. (06 Marks)
 b. Discuss the concept of costs receiver in DSB.S.C wave. (06 Marks)
 - c. With a neat block diagram, explain frequency division multiplexing system. (08 Marks)

OR

- 2 a. The output voltage of a transmitter is given by 400 (1 + 0.4 cos 6280t) cos 3.14×10^7 t. The voltage is fed to a load of 600Ω resistance. Determine:
 - i) Carrier frequency
 - ii) Modulating fly
 - iii) Carrier power
 - iv) Total power o/p. (08 Marks)
 - b. Explain the generation DSBSC waves by using Ring modulator. (08 Marks)
 - c. Mention the disadvantages of vestigial sideband modulation. (04 Marks)

Module-2

- 3 a. The carrier swing of a frequency modulated signal is 70KHz and the modulating signal is a 7KHz sine wave. Determine the modulation index of the FM signal. (04 Marks)
 - b. Explain the generation of FM using Armstrong method.

(06 Marks)

c. Starting from block diagram of PLL obtain its non -linear version of FM detected signal.
(10 Marks)

OR

- 4 a. Mention the comparison of AM and FM system. (06 Marks)
 - b. With the help of diagram, explain the working of FM stereo multiplexing. (07 Marks)
 - c. Explain the working of super heterodyne FM receiver with block diagram. (07 Marks)

Module-3

5 a. Define probability and Axioms of probability.

(07 Marks)

- b. A perfect cubic die is thrown find the probability that:
 - i) An even number comes up
 - ii) A perfect square cone up. (06 Marks)
- c. Determine the Noise equivalent bandwidth for LPF. (07 Marks)

OR

- 6 a. Define mean, correlation cross –correlation and covariance function. (08 Marks)
 - b. Define Probability Density Function (PDF) and its properties of PDF. (08 Marks)
 - c. Calculate the noise voltage at the input of a ratio receivers RF amplifier, using a deivce that has 100Ω equivalent noise resistance and a 200Ω input resistor. The B.W of the amplifier is 1MHz and temperature is 25°C. (04 Marks)

b. Explain about pre-emphasis and de-emphasis in FM in detail. OR a. Show that the noise in AM receives is $\frac{1}{2+\mu}$ using coherent detection. (10 Marks) b. Explain FM threshold reduction using graph and block diagram. (10 Marks) Module-5 9 a. Explain the generation of pulse amplitude modulation with necessary waveforms and equation. b. With the help of block diagram, describe voice codes (VOCODER). (85 Marks) c. An analog waveform with bandwidth 15 kHz is to be quantized with 200 levels and transmitted via binary PCM signal. Find the rite of transmission and bandwidth required. if 10 such signal are to be multiplexed, find the bandwidth requirement. (98 Marks) DR CMRU LEBRARY OR CMRU LEBRARY DESCRIPTION (10 Marks) i. Explain the generation and reconstruction of pulse code modulation. (97 Marks) b. Explain the generation and reconstruction of pulse one modulation. (97 Marks) m(1) = \frac{1}{2π} \cos(4000π1) \cos(1900π1). (97 Marks)	7		Module-4 Derive the expression for figure of merits of DSB – SC receiver.	(10 Marks)
 8 a. Show that the noise in AM receives is μ²/(2+μ²) using coherent detection. (10 Marks) b. Explain FM threshold reduction using graph and block diagram. (10 Marks) 9 a. Explain the generation of pulse amplitude modulation with necessary waveforms and equation. (10 Marks) b. With the help of block diagram, describe voice codes (VOCODER). (95 Marks) c. An analog waveform with bandwidth 15 KHz is to be quantized with 200 levels and transmitted via binary PCM signal. Find the rate of transmission and bandwidth required. if 10 such signal are to be multiplexed, find the bandwidth requirement. (95 Marks) Distinguish between PAM, PWM and PPM. PANGALORE - 560 037 (06 Marks) b. Explain the generation and reconstruction of pulse code modulation. (97 Marks) c. Find the Nyquist rate and Nyquist interval for the following signal. (07 Marks) m(t) = 1/(2π) cos(4000πt) cos(1000πt). 	7		Explain about pre-emphasis and de-emphasis in FM in detail.	(10 Marks)
b. Explain FM threshold reduction using graph and block diagram. (10 Marks) Module-5 a. Explain the generation of pulse amplitude modulation with necessary waveforms and equation. (10 Marks) b. With the help of block diagram, describe voice codes (VOCODER). (05 Marks) c. An analog waveform with bandwidth 15KHz is to be quantized with 200 levels and transmitted via binary PCM signal. Find the rate of transmission and bandwidth required. if 10 such signal are to be multiplexed, find the bandwidth requirement. (05 Marks) OR CMRIT LIBRARY OR CMRIT LIBRARY Distinguish between PAM, PWM and PPM. PANGALORE - 560 037 Explain the generation and reconstruction of pulse code modulation. (07 Marks) Explain the generation and reconstruction of the following signal. m(t) = \frac{1}{2π} \cos(4000πt) \cos(1000πt). (07 Marks)				
Module-5 9 a. Explain the generation of pulse amplitude modulation with necessary waveforms and equation. b. With the help of block diagram, describe voice codes (VOCODER). (05 Marks) c. An analog waveform with bandwidth 15 KHz is to be quantized with 200 levels and transmitted via binary PCM signal. Find the rate of transmission and bandwidth required. if 10 such signal are to be multiplexed, find the bandwidth requirement. (05 Marks) OR CMRIT LIBRARY OR CMRIT LIBRARY Do Bangalore - 560 037 Rangalore - 560 037 Rangalor	8	a.	Show that the noise in AM receives is $\frac{\mu^2}{2+\mu^2}$ using coherent detection.	(10 Marks)
 a. Explain the generation of pulse amplitude modulation with necessary waveforms and equation. b. With the help of block diagram, describe voice codes (VOCODER). c. An analog waveform with bandwidth 15KHz is to be quantized with 200 levels and transmitted via binary PCM signal. Find the rate of transmission and bandwidth required. if 10 such signal are to be multiplexed, find the bandwidth requirement. OR CMRIT LIBRARY Distinguish between PAM, PWM and PPM. b. Explain the generation and reconstruction of pulse code modulation. c. Find the Nyquist rate and Nyquist interval for the following signal. m(t) = 1/2π cos(4000πt) cos(1000πt). (07 Marks) 		b.	Explain FM threshold reduction using graph and block diagram.	(10 Marks)
 equation. b. With the help of block diagram, describe voice codes (VOCODER). c. An analog waveform with bandwidth 15KHz is to be quantized with 200 levels and transmitted via binary PCM signal. Find the rate of transmission and bandwidth required. if 10 such signal are to be multiplexed, find the bandwidth requirement. OR CMRIT LIBRARY b. Explain the generation and reconstruction of pulse code modulation. c. Find the Nyquist rate and Nyquist interval for the following signal. m(t) = 1/2π cos(4000πt) cos(1000πt). (06 Marks) (07 Marks) 	·		Module-5	forms and
 c. An analog waveform with bandwidth 15KHz is to be quantized with 200 levels and transmitted via binary PCM signal. Find the rate of transmission and bandwidth required. if 10 such signal are to be multiplexed, find the bandwidth requirement. (05 Marks) OR CMRIT LIBRARY OR CMRIT LIBRARY BANGALORE - 560 037 BANGALORE - 560 037 CF ind the generation and reconstruction of pulse code modulation. C. Find the Nyquist rate and Nyquist interval for the following signal. m(t) = 1/2π cos(4000πt) cos(1000πt). (07 Marks) 	9	a.	equation.	(10 Marks)
transmitted via binary PCM signal. Find the rate of transmission and bandwidth required. If 10 such signal are to be multiplexed, find the bandwidth requirement. (05 Marks) OR CMRIT LIBRARY BANGALORE - 560 037 Explain the generation and reconstruction of pulse code modulation. C. Find the Nyquist rate and Nyquist interval for the following signal. $m(t) = \frac{1}{2\pi} \cos(4000\pi t) \cos(1000\pi t).$ (06 Marks) (07 Marks)			An analog waveform with handwidth 15KHz is to be quantized with 200	levels and
10 a. Distinguish between PAM, PWM and PPM. b. Explain the generation and reconstruction of pulse code modulation. c. Find the Nyquist rate and Nyquist interval for the following signal. $m(t) = \frac{1}{2\pi} \cos(4000\pi t) \cos(1000\pi t).$ (06 Marks) (07 Marks) (07 Marks)	•	C.	transmitted via binary PCM signal. Find the rate of transmission and bandwidth in 10 such signal are to be multiplexed, find the bandwidth requirement.	required. 11
b. Explain the generation and reconstruction of pulse code modulation. c. Find the Nyquist rate and Nyquist interval for the following signal. $m(t) = \frac{1}{2\pi} \cos(4000\pi t) \cos(1000\pi t). \tag{07 Marks}$				
c. Find the Nyquist rate and Nyquist interval for the following signal. $m(t) = \frac{1}{2\pi} \cos(4000\pi t) \cos(1000\pi t) . \tag{07 Marks}$	10			
$m(t) = \frac{1}{2\pi} \cos(4000\pi t) \cos(4000\pi t)$			Find the Nyquist rate and Nyquist interval for the following signal.	
*** * * *			$m(t) = \frac{1}{2\pi} \cos(4000\pi t) \cos(1000\pi t)$.	(07 Marks)
2 of 2				
2 of 2			****	
2 of 2				
2 of 2				
2 of 2			0, 0,	
2 of 2				
2 of 2				
2 of 2		j		
2 of 2				
2 of 2				
2 of 2				
2 of 2				
			2 of 2	
			4	
A				
		4	<i>i</i> , ₹	
	6			