	Reg. No.			
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	Question Paper Code 12999			
	B.E. / B.Tech DEGREE EXAMINATIONS, NOV / DEC 2024			
	Fourth Semester			
	Electronics and Communication Engineering			
	20FCPC401 - COMMUNICATION THEORY			
	Degulations 2020			
-	Regulations - 2020			100
Dı	Aration: 3 Hours	ax. N	larks:	100
	PART - A (MCQ) $(20 \times 1 = 20 \text{ Marks})$	Mar	rks $\frac{K}{L_{ava}}$, со
1	Answer ALL Questions	1	K1	
1.	(a) Not a product (b) Product (c) Sum (d) None of the above	1	IX I	cor
2	The over modulation occurs when the modulating signal voltage is	an 1	K1	CO1
2.	the carrier voltage	111 -		
	(a) Greater (b) Less (c) Equal (d) None of the above			
3.	Which modulation consists of both lower and upper sidebands?	1	K1	COI
	(a) DSB-SC (b) VSB (c) SSB-SC (d) None of the above			
4.	NBFM bandwidth is .	1	K1	<i>CO2</i>
	(a) fm (b) $2fm(\beta+1)$ (c) 2 fm (d) fm(\beta+1)			
5.	Noise immunity is superior in	1	K1	<i>CO2</i>
	(a) Amplitude Modulation (b) Frequency Modulation			
	(c) Phase Modulation (d) None of the above			
6.	Carson's rule formula for bandwidth calculation is	1	K1	<i>CO2</i>
_	(a) fm (b) $2 \text{fm} (\beta+1)$ (c) 2 fm (d) $2(\Delta f+fm)$			
7.	PLL can be used as	Ι	KI	CO3
0	(a) AM demodulator (b) FM receiver (c) FM demodulator (d)AM receiver	1	V 1	cor
8.	An FM receiver consisting of Amplitude limiters serves the purpose of	1	Λ <i>I</i>	COS
	(a) Amplification (b) Filteration (d) Removal of amplitude variations			
0	(c) Demodulation (d) Removal of amplitude variations	1	K1	CO3
9.	(a) PLI (b) Frequency discriminator (c) Envelope detector (d)Oscillato	r		005
10	The ergodic comes under type random process?	1	K1	CO4
10.	(a) Stationary (b) Non-stationary (c) Both a and b (d) None of the above			
11.	Which one of the following is constant in wide sense stationary?	1	K1	<i>CO4</i>
	(a) Auto correlation (b) Mean (c) All statistics (d) Both a and b			
12.	The mean of a random process is constant then it is called	1	K1	<i>CO</i> 4
	(a) Strict sense stationary (b) Wide sense stationary			
	(c) Both strict sense and wide sense stationary (d) None of the mentioned			
13.	A non-linearity in the system provides	1	K1	<i>CO5</i>
	(a) Thermal noise (b) Shot noise (c) Partition noise (d) Flicker noise	se		
14.	The in-phase and quadrature component of narrow band noise have mean.	1	Kl	CO5
	(a) unity (b) zero (c) Infinite (d) None of the mentioned	,	V_{1}	<i>CO5</i>
15.	Equivalent noise temperature is expressed in	Ι	KI	cos
17	(a) Decibels (b) Kelvin (c) Fahrenheit (d) Celsius	1	V1	C05
16.	circuits are used in FM.	1	Λ1	0.05
17	(a) FIGURE (b) Detemphasis (c) Filteration (d) Both a and b When a PWM signal is sent to an inverter it	1	K1	C06
1/.	(a) Generates snikes (b) Reverses the polarity of the pulses	1		200
	(c) Generates fixed with pulses (d) None of the mentioned			
	(a) i tone of the mentioned			

18.	The compressor and expander together is called(a) Sampler(b) Quantizer(c) Compander(d) None of thementioned(c) Compander(d) None of the	1	K1	<i>CO6</i>
19.	Which of the following is/are the basic operation(s) performed in the transmitter of a PCM?	1	K1	CO6
20.	(a) Sampling (b) Quantising (c) Encoding (d) All of the mentioned The original message signals in frequency division multiplexing are recovered by using individual .	1	K1	<i>CO6</i>
	(a) LPF (b) BPF (c) Modulators (d) Demodulators			
	PART - B $(10 \times 2 = 20 \text{ Marks})$			
21.	Answer ALL Questions A transmitter radiates 9 kW without modulation and 10.125 kW after modulation. Determine depth of modulation.	2	K2	C01
22.	Define modulation index of AM systems.	2	K1	<i>CO1</i>
23.	Compare Narrow band and Wide band FM.	2	K2	<i>CO2</i>
24.	Analyze the bandwidth required for a FM wave in which the modulating frequency signal is 2KHz and the maximum frequency deviation is 12KHz.	2	K2	<i>CO2</i>
25.	What are the applications of phase-locked loops?	2	K1	<i>CO3</i>
26.	Define Coherent Detection.	2	<i>K1</i>	<i>CO3</i>
27.	Describe white noise. Give its characteristics.	2	Kl	<i>CO4</i>
28.	List out the property of power spectral density.	2	KI	CO4
29.	Define threshold effect.	2	KI K2	cos
30.	Compare PPM and PWM.	2	K2	<i>CO</i> 6
	PART - C (6 \times 10 = 60 Marks) Answer ALL Questions			
31.	 a) An AM wave consists of the following components : Carrier component = 5 V peak value Lower sideband component = 2.5 V peak value Upper sideband component = 2.5 V peak value If the AM wave drives a 2 kΩ resistor, find the power delivered to the resistor by (i) Carrier (ii) Lower sideband component and (iii) Upper sideband component. What is the total power delivered? 	10	К2	<i>CO1</i>
	OR			
	b) Construct the balanced modulator circuit for the generation of DSB-SC-AM and explain its operation.	10	K2	<i>CO1</i>
32.	 a) A 25 MHz carrier is modulated by a 400 Hz audio sine wave. If the carrier voltage is 4V and the maximum frequency deviation is 10 kHz, write down the voltage equation of the FM wave. 	10	K2	<i>CO2</i>
	b) Explain how FM wave is generated by Armstrong method.	10	K2	CO2
33.	a) Explain the working principle of super heterodyne receiver with neat block diagram. OR	10	K2	СО3
	b) Demonstrate the concepts of envelope detection for demodulation of AM and explain its operation.	10	K2	СО3
34.	a) Describe in detail various sources of noise.	10	K2	<i>CO4</i>
	b) Explain the term mean, correlation, covariance and ergodicity	10	K2	<i>CO</i> 4

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create

35. a) Explain the significance of Pre-emphasis and De-emphasis circuit on SNR ¹⁰ ^{K2} ^{CO5} improvement in FM system.

OR

- b) What is narrowband noise? Discuss the properties of in-phase and Quadrature 10 K2 CO5 components of a narrowband noise.
- 36. a) Compare the concept of uniform and non-uniform Quantisation in digital ¹⁰ K2 CO6 communication system.

OR

b) Explain the operation of Pulse Code Modulator with neat block diagram. 10 K2 CO6