

S. No.

Enrolment No:



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, December 2019

Course: Communication Systems

Program: B.Tech(ECE)

Course Code: ECEG 3003

Semester: V Time 03 hrs.

Max. Marks: 100

Marks CO

Instructions: Attempt All Questions

SECTION A $(4x5 = 20)$	A (4x5 = 20)
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							Marks	CO
Prove that Pt = $Pc(1+m^2/2)$. Given RF carrier signal of 1 MHz having amplitude (Vpp						05		
= $(-5 \text{ to } +5)$ volts and message signal of 2 KHz having amplitude (Vpp = $-2 \text{ to } +2$)Volts.					t to $+2$) Volts.	(1.5+0.	CO1	
Find modulation index and draw the AM, FM and PM waveform.						5+3)		
Explain sampling. What will be the effect if Fs= 2Fm.					5	CO2.		
Explain the PCM generator with suitable diagram.					3	CO2.		
Calculate P(e)	for FSK.						5	CO ₃
Evaluate the c	hannel ca	pacity using	the Huffma	nn coding fo	or the follow	ing message		
				C		2		
	_						5	CO4
Messages	M1	N	М2	M3	M4	-		
Probability	1/2	1,	4	1/8	1/8			
		S	ECTION B	(4x10 = 40)				
T								
	•			*	it resistance.			
							10	CO1
	ail swith th	na haln of sui	table diagra	m Delta mo	dulation and	I Adaptiva		
					10	CO ₂		
					10	CO ₃		
	tropy and	channel cap	acity (Check	whether Sh	annon limit	of channel		
			• '					
	, ,		8		56		10	CO4
Messages	M1	M2	M3	M4	M5	M6	-	
	1/2	1/4	1/16	1/16	1/16	+	1	
	=(-5 to +5) vol Find modulati Explain sampl Explain the PC Calculate P(e) Evaluate the c with respective Messages Probability What do you r Prove that Noi F=F1+(F2-1/C) +Te/T ₀ . Explain in det Delta Modulate Explain with t message"01" Deduce the en	=(-5 to +5) volts and mer Find modulation index Explain sampling. What Explain the PCM gener Calculate P(e) for FSK. Evaluate the channel cat with respective probabitation in the probability with respective probabitation in the probability with the provest that Noise figure F=F1+(F2-1/G1)+(F3-1-F2/T0). Explain in detail with the Delta Modulation in the properties of the entropy and capacity is obeyed) using the product of the properties	=(-5 to +5) volts and message signal Find modulation index and draw the Explain sampling. What will be the Explain the PCM generator with sur Calculate P(e) for FSK. Evaluate the channel capacity using with respective probabilities Messages M1 N Probability 1/2 1/2 What do you mean by noise temperar Prove that Noise figure of the cascade F=F1+(F2-1/G1) +(F3-1/G1G2)++Te/T ₀ . Explain in detail with the help of sur Delta Modulation Explain with the help of block diaground message "01" Deduce the entropy and channel cap capacity is obeyed) using Shannon-H Messages M1 M2	=(-5 to +5) volts and message signal of 2 KHz har Find modulation index and draw the AM, FM and Explain sampling. What will be the effect if Fs= Explain the PCM generator with suitable diagral Calculate P(e) for FSK. Evaluate the channel capacity using the Huffmar with respective probabilities Messages M1 M2 Probability ½ ¼ SECTION B What do you mean by noise temperature and noin Prove that Noise figure of the cascaded system is F=F1+(F2-1/G1)+(F3-1/G1G2)++((Fn-1)+Te/T ₀ . Explain in detail with the help of suitable diagram Delta Modulation Explain with the help of block diagram QPSK geomessage "01" Deduce the entropy and channel capacity (Check capacity is obeyed) using Shannon-Fano coding Messages M1 M2 M3	=(-5 to +5) volts and message signal of 2 KHz having ampliture. Find modulation index and draw the AM, FM and PM waveful Explain sampling. What will be the effect if Fs= 2Fm. Explain the PCM generator with suitable diagram. Calculate P(e) for FSK. Evaluate the channel capacity using the Huffmann coding for with respective probabilities Messages M1 M2 M3 Probability 1/2 1/4 1/8 SECTION B (4x10 = 40) What do you mean by noise temperature and noise equivalent Prove that Noise figure of the cascaded system is F=F1+(F2-1/G1) +(F3-1/G1G2)++((Fn-1)/(G1 G2C4+Te/T0.) Explain in detail with the help of suitable diagram, Delta modulation Explain with the help of block diagram QPSK generation and message"01" Deduce the entropy and channel capacity (Check whether Sh capacity is obeyed) using Shannon-Fano coding of the follow Messages M1 M2 M3 M4	=(-5 to +5) volts and message signal of 2 KHz having amplitude (Vpp =-2 Find modulation index and draw the AM, FM and PM waveform. Explain sampling. What will be the effect if Fs= 2Fm. Explain the PCM generator with suitable diagram. Calculate P(e) for FSK. Evaluate the channel capacity using the Huffmann coding for the follow with respective probabilities Messages M1 M2 M3 M4 Probability ½ ¼ 1/8 1/8 1/8 SECTION B (4x10 =40) What do you mean by noise temperature and noise equivalent resistance. Prove that Noise figure of the cascaded system is F=F1+(F2-1/G1) +(F3-1/G1G2)++((Fn-1)/(G1 G2Gn-1)) where +Te/To. Explain in detail with the help of suitable diagram, Delta modulation and Delta Modulation Explain with the help of block diagram QPSK generation and retrieve the message"01" Deduce the entropy and channel capacity (Check whether Shannon limit capacity is obeyed) using Shannon-Fano coding of the following message M1 M2 M3 M4 M5	=(-5 to +5) volts and message signal of 2 KHz having amplitude (Vpp =-2 to +2) Volts. Find modulation index and draw the AM, FM and PM waveform. Explain sampling. What will be the effect if Fs= 2Fm. Explain the PCM generator with suitable diagram. Calculate P(e) for FSK. Evaluate the channel capacity using the Huffmann coding for the following message with respective probabilities Messages M1 M2 M3 M4 Probability 1/2 1/4 1/8 1/8 SECTION B (4x10 =40) What do you mean by noise temperature and noise equivalent resistance. Prove that Noise figure of the cascaded system is F =F1+(F2-1/G1) +(F3-1/G1G2)++((Fn-1)/(G1 G2Gn-1)) where F =1 +Te/T0. Explain in detail with the help of suitable diagram, Delta modulation and Adaptive Delta Modulation Explain with the help of block diagram QPSK generation and retrieve the message"01" Deduce the entropy and channel capacity (Check whether Shannon limit of channel capacity is obeyed) using Shannon-Fano coding of the following messages.	Prove that Pt =Pc(1+m²/2). Given RF carrier signal of 1 MHz having amplitude (Vpp =(-5 to +5) volts and message signal of 2 KHz having amplitude (Vpp =-2 to +2)Volts. Find modulation index and draw the AM, FM and PM waveform. Explain sampling. What will be the effect if Fs= 2Fm. Explain the PCM generator with suitable diagram. Calculate P(e) for FSK. Evaluate the channel capacity using the Huffmann coding for the following message with respective probabilities Messages M1 M2 M3 M4 Probability ½ ¼ 1/8 1/8 SECTION B (4x10 =40) What do you mean by noise temperature and noise equivalent resistance. Prove that Noise figure of the cascaded system is F=F1+(F2-1/G1) +(F3-1/G1G2)++((Fn-1)/(G1 G2G _{n-1)}) where F=1 +Te/To. Explain in detail with the help of suitable diagram, Delta modulation and Adaptive Delta Modulation Explain with the help of block diagram QPSK generation and retrieve the message"01" Deduce the entropy and channel capacity (Check whether Shannon limit of channel capacity is obeyed) using Shannon-Fano coding of the following messages.

SECTION-C (2x10 = 20)

Q9	a)Generate the (7,4) code for the message 1101.	05	CO4
	b) Find mutual information, Entropy and channel capacity for the following matrix: $P(XY) = \begin{pmatrix} 0.8 & 0.2 \\ 0.3 & 0.7 \end{pmatrix}$	08	CO4
	c) Find P(e) for the message 11010110 undergoing DPSK.	07	CO3
Q10.	a) How the message signal is retrieved from FM using linear model of PLL (first order)	07	CO1
	b) How the message signal is retrieved from upper side band signal using costas loop and deduce the expression for the final output.	07	CO1
	c) Deduce the expression for figure of merit of PPM	06	CO2.