UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2019

Course: Communication Systems   Semester: V
Program: B.Tech(ECE)   Time 03 hrs.
Course Code: ECEG 3003   Max. Marks: 100

Instructions: Attempt All Questions

SECTION A (4x5 =20)						
S. No.					**Marks**	**CO**
Q 1	Prove that $Pt = Pc(1+m^2/2)$. 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.				**05** **(1.5+0.5+3)**	**CO1**
Q2.	Explain sampling. What will be the effect if Fs= 2Fm. Explain the PCM generator with suitable diagram.				**5**	**CO2.**
Q3.	Calculate P(e) for FSK.				**5**	**CO3**
Q4.	Evaluate the channel capacity using the Huffmann coding for the following message with respective probabilities				**5**	**CO4**
	Messages	M1	M2	M3	M4	
	Probability	½	¼	1/8	1/8	
SECTION B (4x10 =40)						
Q5	What do you mean by noise temperature and noise equivalent resistance. Prove that Noise figure of the cascaded system is $F = F1+(F2-1/G1) +(F3-1/G1G2)+……..+((Fn-1)/(G1\ G2…G_{n-1}))$ where $F = 1 +Te/T_0$.				**10**	**CO1**
Q6.	Explain in detail with the help of suitable diagram, Delta modulation and Adaptive Delta Modulation				**10**	**CO2**
Q7.	Explain with the help of block diagram QPSK generation and retrieve the message"01"				**10**	**CO3**
Q8.	Deduce the entropy and channel capacity (Check whether Shannon limit of channel capacity is obeyed) using Shannon-Fano coding of the following messages.				**10**	**CO4**
	Messages	M1	M2	M3	M4	M5	M6
	Probability	½	¼	1/16	1/16	1/16	1/16
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: $P(XY) = \begin{matrix} 0.8 & 0.2 \\ 0.3 & 0.7 \end{matrix}$	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.