PRN No.	

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December 2023 (ENDSEM) EXAM

TY (SEMESTER - I)

COURSE NAME Information Theory and Coding **Branch** Electronics & Telecommunication Engineering

COURSE CODE ETUA31205C

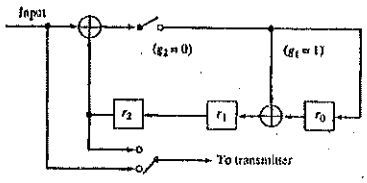
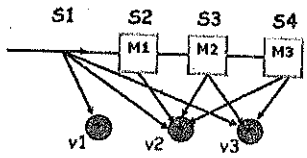
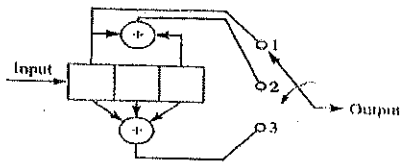
(PATTERN 2020)

Time: [1Hr. 30 Min] **[Max. Marks: 40]**

(*) Instructions to candidates:

1) **Figures to the right indicate full marks.**
2) **Use of scientific calculator is allowed**
3) **Use suitable data wherever required**
4) **All questions are compulsory. Solve any one sub question from Question 3 and any two sub questions each from Questions 4,5 and 6 respectively.**

Q. No.	Question Description	Max. Marks	CO mapped	BT Level
Q.1	a) With the mathematical expression explain the significance of entropy	[2]	CO1	2/Understand
Q2	a)State and explain Shannon's Source Coding Theorem	[2]	CO2	2/Understand
Q3.	a) Derive and Examine all parameters of a Hamming Code	[6]	CO3	2Apply,Analyze
	b) The parity check matrix of a (7, 4) Hamming code is as under. Calculate syndrome vector for single bit errors where Syndrome Vector $[S] = [E]_{1\times7}[H^T]_{7\times3}$ $H = \begin{bmatrix} 1 & 1 & 0 & 1 & 1 & 0 & 0 \\ 1 & 1 & 1 & 0 & 0 & 1 & 0 \\ 1 & 0 & 1 & 1 & 0 & 0 & 1 \end{bmatrix}$	[6]	CO3	3 Apply
Q.4	a) State the criteria for a code to be cyclic and explain the same with an example	[5]	CO4	2 Understand
	b) For the linear cyclic code Ccyc(7, 4) generated by the generator polynomial $g(X) = 1 + X + X^3$, determine the systematic form of the codeword	[5]	CO4	3 Apply
	c) For the shift-register encoder (7,4), find output when the input message is 1001,1110,1100, 0101	[5]	CO4	3 Apply

				
Q.5	a)Explain the encoding procedure of RS code	[5]	CO5	2 Understand
	b)Construct the modulo addition and multiplication table for GF(5)	[5]	CO5	3Apply
	c) construct GF(8) using the primitive polynomial p(x) = $x^3 + x + 1$.	[5]	CO5	3Apply
Q.6)	a) Find the output of the following convolutional encoder for an input data of 10110 	[5]	CO6	2/3 Apply, Analyze
	b) Discuss the difference between Block Versus Convolutional Codes	[5]	CO6	2/3 Apply, Analyze
	c) Draw the tree diagram representation for the following circuit 	[5]	CO6	2/3 Apply, Analyze