Q. Code: 819660

Reg. No. | | | | | | | | | | | | | |

B.E. / B.TECH. DEGREE EXAMINATIONS, MAY 2024

Third Semester

IT22303 – DIGITAL COMMUNICATION

(Information Technology)

(Regulation 2022)

TIME: 3 HOURS **MAX. MARKS: 100**

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	Perform arithmetic operations in any number system & to simplify the Boolean expression using K –Map and Tabulation techniques.	**3**
CO 2	Design and analysis of a given digital Combinational circuit.	**4**
CO 3	Design and analysis of a given digital Sequential hardware circuit.	**4**
CO 4	Analyse channel capacity for various channels and to generate codewords for different media elements.	**4**
CO 5	To analyze the performance of audio and video coders.	**4**

PART- A (20 x 2 = 40 Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	Find the octal equivalent of hexadecimal number AB.CD.	**1**	**3**
2.	Draw the logic diagram for the Boolean expression [(A+B)C]'D using NAND gates.	**1**	**2**
3.	Convert $(367)_{10}$ into Excess - 3 code.	**1**	**3**
4.	Find the minterm expansion of f(a,b,c,d)= a'(b'+d')+acd'	**1**	**2**
5.	Draw the half adder circuit.	**2**	**3**
6.	Distinguish between the combinational and sequential logic circuits.	**2**	**2**
7.	Explain the design procedure for combinational circuits.	**2**	**2**
8.	List the important features of HDL.	**2**	**2**
9.	Differentiate flip- flop and Latch.	**3**	**2**

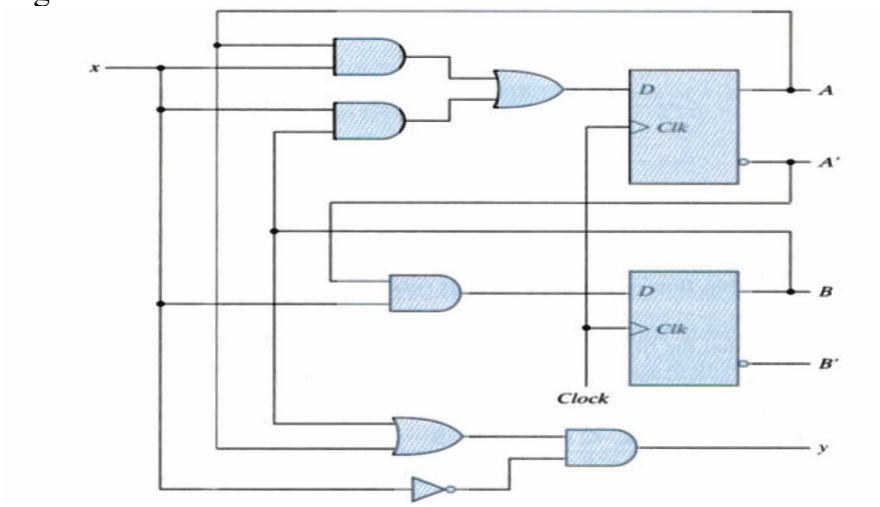
10.	Draw the excitation table and state diagram for JK and SR Flip-Flop.	**3**	**3**
11.	Draw the state diagram of a MOD-10 counter.	**3**	**3**
12.	Convert a T-Flipflop into an sr-flipflop. Draw the circuit.	**3**	**3**
13.	Brief about mutual information and channel capacity.	**4**	**2**
14.	Differentiate between binary symmetric channel and Erasure channel.	**4**	**2**
15.	Explain briefly what is an entropy and its properties.	**4**	**2**
16.	Examine the main idea of code efficiency.	**4**	**2**
17.	Write equation for linear predictive coding.	**5**	**2**
18.	Draw the frame format of H.261.	**5**	**2**
19.	Differentiate Intra-frame and Inter frame compression techniques.	**5**	**2**
20.	Differentiate between lossless and lossy video compression.	**5**	**2**

PART- B (5 x 10 = 50 Marks)

		Marks	CO	RBT LEVEL
21. (a)	Simplify the following functions using K-Map technique and implement using NOR gates $F(W,X,Y,Z)=\sum m(0,6,8,13,14)+\sum d(2,4,10)$	**(10)**	**1**	**3**
	(OR)3			
(b)	Determine the prime-implicants of the Boolean function by using the tabulation method. $F(w, x, y, z)=\Sigma(1,4,6,7,8,9,10,11,15)$.	**(10)**	**1**	**3**
22. (a)	Design a combinational circuit that converts 8421 BCD code to Excess-3 code.	**(10)**	**2**	**3**

(OR)

(b)	Implement the following Boolean function with MUX. F(A,B,C,D) = ∑m(0,2,6,10,11,12,13)	**(10)**	**2**	**3**
23. (a)	Analyze the clocked sequential circuit and obtain the state equations and state diagram	**(10)**	**3**	**3**



(OR)

(b)	Design a synchronous mod-8 counter using JK Flipflop and implement it.	**(10)**	**3**	**3**
24. (a)	A Memory less source emits six messages with probabilities {0.4, 0.19,0.16,0.15,0.10}. Find the Shannon - Fano code and determine its efficiency.	**(10)**	**4**	**3**

(OR)

(b)	Construct the Huffman code with minimum code variance for the following probabilities and also determine the code variance and code efficiency: {0.07, 0.08, 0.04, 0.26, 0.14, 0.09, 0.07,0.25}	**(10)**	**4**	**3**
25. (a)	Explain in detail MPEG-1,2,3,4 Video standards with frameworks.	**(10)**	**5**	**3**

(OR)

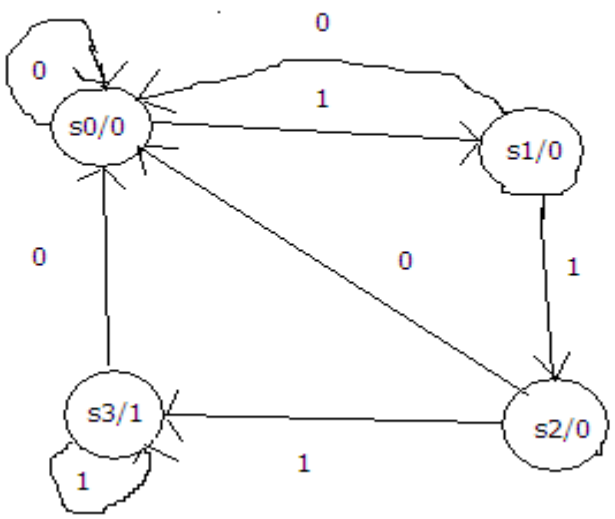
(b)	Explain in detail Linear Predictive Coder and how the parameters are transmitted in Linear predictive coder.	**(10)**	**5**	**3**

PART- C (1 x 10 = 10 Marks)

(Q.No.26 is compulsory)

	Marks	CO	RBT

			LEVEL	
26.	Design the sequential circuit specified by the state diagram using SR flip flop.	**(10)**	**3**	**3**



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