

Hall Ticket Number :

R-19

Code: 19A454T

III B.Tech. I Semester Supplementary Examinations Nov/Dec 2023

Digital Communication

(Electronics and Communication Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

UNIT-I

- | | Marks | CO | BL |
|--|-------|-----|----|
| 1. a) Explain in detail about Companding | 7M | 1&3 | L2 |
| b) Identify the following for a 10-bit PCM | | | |
| i. Number of Quantization Levels | 7M | 1&3 | L2 |
| ii. Signal to Noise Ratio | | | |

OR

- | | | | |
|---|----|-----|----|
| 2. a) Explain the Basic elements of Pulse Code Modulation | 7M | 1&3 | L2 |
| b) Obtain the expression for quantization noise power in PCM system | 7M | 1&3 | L1 |

UNIT-II

- | | | | |
|---|----|-----|----|
| 3. a) Describe the BPSK modulation technique with the help of a neat diagram. | 7M | 1&3 | L1 |
| b) Draw the waveforms of FSK for the data 101010101010 | 7M | 1&3 | L1 |

OR

- | | | | |
|---|----|-----|----|
| 4. a) Define and draw the waveforms of ASK, FSK, PSK and DPSK for the data sequence 110100110111. | 7M | 1&3 | L1 |
| b) Compare various digital modulation techniques | 7M | 1&3 | L1 |

UNIT-III

- | | | | |
|---|----|-----|----|
| 5. a) Explain the concept of amount of information and its properties | 7M | 2&3 | L2 |
| b) Write a short note on Mutual information and Self information | 7M | 2&3 | L1 |

OR

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|--|----|-----|----|
| 6. a) What is entropy? State and prove the properties of entropy | 7M | 2&3 | L1 |
| b) Prove that $I(X,Y) = H(X) - H(X/Y)$ | 7M | 2&3 | L2 |

UNIT-IV

- | | | | |
|---|----|-----|----|
| 7. a) Explain the purpose of Syndrome in Linear Block codes | 7M | 2&3 | L2 |
| b) Explain Shanon-Fano coding. | 7M | 2&3 | L2 |

OR

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|---|-----|-----|----|
| 8. a) For a Systematic Linear Block code the parity bits are given by the following expressions
$C_4=d_0+d_1+d_2+d_3$ $C_5=d_1+d_3$ $C_6=d_1+d_2+d_3$
Then find the following | | | |
| i) Dimensions of the code | | | |
| ii) The Generator Matrix and Parity Check Matrix | | | |
| iii) All Possible Code words | 14M | 2&3 | L6 |
| iv) Syndrome for $R=[1101\ 010]$ | | | |

UNIT-V

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|--|----|-----|----|
| 9. a) Describe the Algebraic Structure of Cyclic codes | 7M | 2&3 | L1 |
| b) Explain the Syndrome circuit for Cyclic codes | 7M | 2&3 | L2 |

OR

- | | | | |
|---|----|-----|----|
| 10. a) For a (2,1,3) Convolution encoder if $g_1=[1\ 0\ 1]$ $g_2=[1\ 1\ 1]$ then identify Output sequence for an input message sequence 11011 | 7M | 2&3 | L2 |
| b) Construct a (7, 4) binary systematic cyclic code using a generator polynomial $g(x) = x^3+x^2+1$ for the data: 1010 | 7M | 2&3 | L2 |

Important Note: 1. On completing your answers. Compulsorily draw diagonal cross line on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg. 32+8=40, will be treated as malpractice.

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Digital Signal Processing

(Electronics and Communication Engineering)

Max. Marks: 70

Time: 3 Hours

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Marks CO BL

UNIT-I

1. Find the solution of 2nd order difference equation
 $y(n) = (5/6)y(n-1) - (1/6)y(n-2) + x(n)$, for the input sequence $x(n) = 2^n U(n)$ 14M CO1 L1

OR

2. Summarize the following properties of DFT:
- a) Periodicity
 - b) Time Reversal
 - c) Frequency Shifting
- 14M CO1 L2

UNIT-II

3. Examine the 8-point DFT of the sequence $x(n) = \{2, 2, 2, 2, 1, 1, 1, 1\}$ using decimation in time FFT algorithm. 14M CO1 L4

OR

4. a) List the differences and similarities between DIT and DIF algorithms. 7M CO1 L1
b) Write the steps for radix-2 DIT FFT algorithm. 7M CO1 L6

UNIT-III

5. Determine the order of the analog butterworth filter that has a -2 dB pass band attenuation at a frequency of 20 rad/sec and atleast -10 dB stop band attenuation at 30 rad/sec. 14M CO2 L5

OR

6. Determine the transposed direct form-II for the given system
 $y(n) = \frac{1}{2}y(n-1) - \frac{1}{4}y(n-2) + x(n) + x(n-1)$ 14M CO2 L5

UNIT-IV

7. With the help of block diagram explain the sampling rate conversion by a rational factor 'I/D'. Obtain necessary expressions 14M CO3 L2

OR

8. a) Discuss Interpolation by a factor I. 7M CO3 L1
b) Discuss the Filter Design and Implementation for Sampling rate conversion. 7M CO3 L1

UNIT-V

9. Explain about Oversampling D/A conversion in signal processing applications. 14M CO4 L2

OR

10. How reverberation, echo and chorus effects are added to the music? 14M CO4 L1

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Code: 19A45BT

III B.Tech. I Semester Supplementary Examinations Nov/Dec 2023

Advanced Digital Design Concepts
(Electronics and Communication Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

Marks CO BL

UNIT-I

1. Summarize the steady state electrical behavior of CMOS circuits 14M CO1 L2

OR

2. a) Outline about Low voltage CMOS logic and interfacing, 8M CO1 L4

b) Classify various CMOS logic families. 6M CO1 L4

UNIT-II

3. Describe the VHDL Program structure with an example. 14M CO2 L2

OR

4. Design an 8X1 Mux using 4x1 Mux in VHDL. 14M CO2 L6

UNIT-III

5. Explain about the behavioral and data flow models with an example. 14M CO3 L2

OR

6. a) Describe the Syntax of If Statement with an example. 7M CO3 L2

b) Differentiate Concurrent and Sequential signal assignment statements 7M CO3 L2

UNIT-IV

7. a) Explain about barrel shifter with neat diagram? 7M CO4 L2

b) Explain about 3-bit Ripple carry adder with neat sketches. 7M CO4 L2

OR

8. a) Design a full adder using VHDL. 7M CO4 L6

b) Design 3-bit Binary to gray code converter. 7M CO4 L6

UNIT-V

9. a) Design JK flip-flop using D Flip-Flop. 8M CO5 L6

b) Describe the T Flip-Flop with its logic diagram. 6M CO5 L2

OR

10. Describe the working principle of any n-bit shift register using VHDL. 14M CO5 L2

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