## 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 ( $5 \times 14=70$ Marks )

## UNIT-I

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 ii. Signal to Noise Ratio

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

## 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 10101010101010
7M 1\&3 L1

## OR

4. a) Define and draw the waveforms of ASK, FSK, PSK and DPSK for the data sequence 110100110111.
b) Compare various digital modulation techniques

7M 1\&3 L1

## UNIT-III

5. a) Explain the concept of amount of information and its properties
b) Write a short note on Mutual information and Self information

## OR

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 283 L2

## UNIT-IV

7. a) Explain the purpose of Syndrome in Linear Block codes
b) Explain Shanon-Fano coding.

7M 283 L2
7M $2 \& 3$ L2

## OR

8. a) For a Systematic Linear Block code the parity bits are given by the following expressions
$\mathrm{C}_{4}=\mathrm{d}_{0}+\mathrm{d}_{1}+\mathrm{d}_{2}+\mathrm{d}_{3} \quad \mathrm{C}_{5}=\mathrm{d}_{1}+\mathrm{d}_{3} \quad \mathrm{C}_{6}=\mathrm{d}_{1}+\mathrm{d}_{2}+\mathrm{d}_{3}$
Then find the following
i) Dimensions of the code ii) The Generator Matrix and Parity Check Matrix
iii) All Possible Code words iv) Syndrome for $\mathrm{R}=\left[\begin{array}{lll}1101 & 010\end{array}\right.$

UNIT-V
9. a) Describe the Algebraic Structure of Cyclic codes

7M 283 L1
b) Explain the Syndrome circuit for Cyclic codes

OR
10. a) For a $(2,1,3)$ Convolution encoder if $g_{1}=\left[\begin{array}{lll}1 & 0 & 1\end{array}\right] \mathrm{g}_{2}=\left[\begin{array}{lll}1 & 1 & 1\end{array}\right]$ then identify Output sequence for an input message sequence 11011
b) Construct a $(7,4)$ binary systematic cyclic code using a generator polynomial $g(x)=x^{3}+x^{2}+1$ for the data: 1010

# Hall Ticket Number : 

## Code: 19A453T

## R-19

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

## Digital Signal Processing

(Electronics and Communication Engineering)
Max. Marks: 70
Time: 3 Hours
Answer any five full questions by choosing one question from each unit ( $5 \times 14=70$ Marks )
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Marks CO BL

## UNIT-I

1. Find the solution of 2 nd 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
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 $x(\quad\{2,2,2,2,1,1,1,1\}$ using decimation in time FFT algorithm.

## 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 $20 \mathrm{rad} / \mathrm{sec}$ and atleast -10 dB stop band attenuation at $30 \mathrm{rad} / \mathrm{sec}$.

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

## UNIT-IV

7. With the help of block diagram explain the sampling rate conversion by a rational factor 'I/D'. Obtain necessary expressions
8. a) Discuss Interpolation by a factor I.
b) Discuss the Filter Design and Implementation for Sampling rate conversion.

7 M CO3 L1

## UNIT-V

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

OR
10. How reverberation, echo and chorus effects are added to the music?
$\square$

## R-19

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 ( $5 \times 14=70$ Marks )

## UNIT-I

1. Summarize the steady state electrical behavior of CMOS circuits

## OR

2. a) Outline about Low voltage CMOS logic and interfacing, 8M CO1 L4
b) Classify various CMOS logic families.
$6 \mathrm{M} \mathrm{CO1} \mathrm{L4}$

## UNIT-II

3. Describe the VHDL Program structure with an example.

14M CO2 L2

## OR

4. Design an $8 \times 1$ Mux using $4 \times 1$ Mux in VHDL.

## UNIT-III

5. Explain about the behavioral and data flow models with an example. $14 \mathrm{M} \quad$ CO3 L2

## OR

6. a) Describe the Syntax of If Statement with an example.

7 M 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.

7 M CO4 L2

## OR

8. a) Design a full adder using VHDL.

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

7M CO4 L6
9. a) Design JK flip-flop using D Flip-Flop.

8M CO5 L6
b) Describe the T Flip-Flop with its logic diagram.
$6 \mathrm{M} \mathrm{CO5}$ L2

## OR

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

# Hall Ticket Number : 

## Code: 19A452T

## R-19

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

## Antennas and Wave Propagation

(Electronics and Communication Engineering)
Max. Marks: 70
Time: 3 Hours
Answer any five full questions by choosing one question from each unit ( $5 \times 14=70$ Marks )
$* * * * * * * * *$
Marks CO BL

## UNIT-I

1. a) List out the different field zones. And explain them briefly.

5M CO1 L1
b) Write short notes on:
i. Beam width
ii. HPBW
iii. FNBW
iv. Resolution

9M CO1 L1

## OR

2. a) An antenna has $\mathrm{Rr}=73, \mathrm{RL}=2$. Compute its efficiency.

4M CO1 L3
b) Illustrate the Fields from Oscillating dipole with neat sketches. 10M CO1 L3

## UNIT-II

3. a) Define an Array? Mention the types of Arrays.

4 M CO2 L2
b) Discuss broadside array and end fire array with neat diagrams. 10M CO2 L2

## OR

4. a) Illustrate the principle of pattern multiplication with an example.

7 M CO2 L3
b) Discuss about the Folded Dipoles \& their characteristics
$7 \mathrm{M} \mathrm{CO2}$ L2

## UNIT-III

5. a) Draw the geometrical structure of Helical Antenna and Give the applications of the same antenna.

7 M CO3 L1
b) Classify the types of horn antennas. And define them.
$7 \mathrm{M} \mathrm{CO3}$ L1

## OR

6. a) Explain the geometry of paraboloidal reflector with neat diagram.
$8 \mathrm{M} \quad \mathrm{CO} 3 \quad \mathrm{~L} 4$
b) Explain about the cassegrain and offset feed systems in paraboloidal reflectors.

## UNIT-IV

7. a) Explain the structure of Atmosphere.

10M CO4 L2
b) Define the space wave and surface wave.

4 M CO 4 L 1

## OR

8. a) With necessary equations, give the details of Reduction factor and numerical Distance.

10M CO4 L1
b) Explain about tilt in ground propagation.

4 M CO4 L4
9. a) Draw the structure of lonosphere with layers and their heights. 10M CO4 L2
b) With neat sketch, explain about Ray path SKW propagation. 4M CO4 L1
$\begin{array}{lrll}\text { 10. a) Derive the expression for refractive index in the lonosphere. } & 10 \mathrm{M} & \mathrm{CO} 4 & \mathrm{~L} 2 \\ \text { b) What is the electron density of the layer if critical frequency is } 3 \mathrm{MHz} \text { ? } & 4 \mathrm{M} & \mathrm{CO} 4 & \mathrm{~L} 3\end{array}$

