| Hall Ticket Number : | | | | | | | | | | |
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**R-19**

**Code: 19A453T**

III B.Tech. I Semester Regular Examinations February 2022

# 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 x 14 = 70Marks )**

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| | | Marks | CO | Blooms Level |
|---|---|---|---|---|
| | **UNIT–I** | | | |
| 1. a) | Write in brief about properties of DFT? | 7M | CO1 | L3,L2 |
| b) | Consider an LTI system with impulse response $h(t)=e^{-t}u(t)$. Find the system response of the input $x(t)=\sin 2tu(t)$. | 7M | CO1 | L3 |
| | **OR** | | | |
| 2. a) | A causal LTI system described by the difference equation. $$y(n)-ay(n-1)=bx(n)-x(n-1)$$ Where 'a' is real and less than 1 in magnitude? Find the value of 'b' such that magnitude of response will satisfy the following condition. This kind of system is called all-pass system, as it does not attenuate the input for any value of frequency. $$\left\|H\left(e^{j\mu}\right)\right\|=1 \qquad \forall \mu$$ | 7M | CO1 | L5 |
| b) | Compute the DFT of each of the following finite length sequences considered to be length N: $(i)\ x(n)=¢(n)$ $(ii)\ x(n)=¢(n-n_0),$ where $0<n_0<N$ $(iii)\ x(n)=a^n,$ where $0\le n<N-1$ $(iv)\ x(n)=\begin{cases}1 & \text{where } n \text{ even}\\ 0 & \text{where } n \text{ odd}\end{cases}$ | 7M | CO1 | L4 |
| | **UNIT–II** | | | |
| 3. | An 8-point sequence is given by $x(n)=\{2,2,2,2,1,1,1,1\}$. Compute the 8-point DFT by Radix-2 DIF FFT algorithm. | 14M | CO1 | L3 |
| | **OR** | | | |
| 4. a) | (i) What are the number of multiplications and additions required for computation of 64 point FFT?<br>(ii) What is twiddle factor?<br>(iii) What is the importance of radix-2? | 7M | CO1 | L2, L1, L1, L2 |
| b) | Compute the 8-point DIT FFT of $x(n)=(-1)^n$. | 7M | CO1 | |

## UNIT–III

5. a) Design a Filter with

$$H_d(e^{jw}) = e^{-j3w} \quad ; \quad -\pi/4 \le w \le \pi/4$$
$$0 \quad ; \quad \pi/4 \le w \le \pi$$

Using Hamming Window for N=7 — 7M CO2 L4

b) Using the bilinear transformation, obtain H (z) from analog transfer function H(s) when T=1s.

$$H(s) = \frac{s^3}{(s+1)(s^2+2s+2)}$$

7M CO2 L3

**OR**

6. a) (i) What are the properties of Chebyshev type-1 and type-2 filter? L1, L2,

(ii) What is frequency warping? 7M CO2 L2

b) Determine Direct form I Realization for following system.

Y(n)=0.5y(n-1)-0.25y(n-2)+x(n)+0.4x(n-1) — 7M CO2 L5

## UNIT–IV

7. a) Consider the unit step signal. Obtain the signal with a decimation factor '2' and interpolation factor '2'. — 4M CO3 L3

b) Explain the Deccimation by a factor D in detail. — 10M CO3 L4

**OR**

8. Discuss Multistage Implementation of Sampling rate conversion. — 14M CO3 L3

## UNIT–V

9. a) A speech signal s(t) is digitized at a sampling rate of 10 kHz. The speech signal was destroyed once the sequence s(n) was stored on a magnetic tape. Later, it is required to obtain the speech signal sampled at the standard 8 kHz used in telephony. Develop a method to do this using discrete-time processing. — 7M CO4 L5

b) Considering an oversampling ADC system with maximum analog signal frequency of 20 kHz and ADC resolution of 14 bits, determine the oversampling rate to improve the ADC resolution to 16-bit resolution. — 7M CO4 L4

**OR**

10. a) Describe spectral analysis of non-stationary signals in DSP. — 7M CO4 L5

b) Explain about Oversampling D/A conversion in signal processing applications — 7M CO4 L1

***END***

| Hall Ticket Number : | | | | | | | | | | |
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**R-19**

**Code: 19A45FT**

III B.Tech. I Semester Regular Examinations Jan/Feb 2022

# Electronic Measurements and Instrumentation

( Electronics and Communication Engineering )

Max. Marks: 70 Time: 3 Hours

**Answer any *five full* questions by choosing one question from each unit ( 5 x 14 = 70Marks )**

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| | | Marks | CO | Blooms Level |
|---|---|---|---|---|
| | **UNIT–I** | | | |
| 1. | Explain operating mechanism of D'Arsonval Galvanometer using torque equation. | 14M | CO1 | L2 |
| | **OR** | | | |
| 2. | Differentiate between accuracy, precision and resolution. | 14M | CO1 | L1 |
| | **UNIT–II** | | | |
| 3. | Describe the working of square and pulse generators. | 14M | CO1 | L2 |
| | **OR** | | | |
| 4. | Discuss the detailed mechanism of harmonic distortion analyzers. | 14M | CO1 | L2 |
| | **UNIT–III** | | | |
| 5. | Explain the digital storage oscilloscope with a block diagram. | 14M | CO1 | L2 |
| | **OR** | | | |
| 6. | Describe the working of cathode ray tube and measurement methodology. | 14M | CO1 | L4 |
| | **UNIT–IV** | | | |
| 7. | Explain the principle of Maxwell's and Hays Bridge working. | 14M | CO1 | L4 |
| | **OR** | | | |
| 8. | Describe the different types of AC bridges and their applications. | 14M | CO1 | L4 |
| | **UNIT–V** | | | |
| 9. | Describe the transducers classifications. | 14M | CO1 | L2 |
| | **OR** | | | |
| 10. | Explain the principle and working of strip chart recorders and X-Y recorder. | 14M | CO1 | L2 |

***END***

| Hall Ticket Number : | | | | | | | | | | |
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**R-19**

**Code: 19A451T**

III B.Tech. I Semester Regular Examinations February 2022

# Microprocessors & Interfacing

( 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 | Blooms Level |
|---|---|---|---|---|---|
| | | **UNIT–I** | | | |
| 1. | a) | Explain in detail about the Register Organization of 8086. | 7M | 1 | 2 |
| | b) | Write short notes on EU-Execution Unit of 8086 microprocessor. | 7M | 1 | 3 |
| | | **OR** | | | |
| 2. | a) | List and describe briefly about the flag bits available in 8086 microprocessor. | 7M | 1 | 4 |
| | b) | Write an 8086 Assembly Language Program to sort the array of numbers in ascending and descending order. | 7M | 1 | 5 |
| | | **UNIT–II** | | | |
| 3. | a) | Discuss the significance of atleast '7' pins of 8086. | 7M | 2 | 3 |
| | b) | Explain the importance of 8257 DMA controller with 8086. | 7M | 2 | 2 |
| | | **OR** | | | |
| 4. | a) | Draw the timing diagram for bus operation cycle of 8086. | 7M | 2 | 4 |
| | b) | Discuss about the maximum mode operation of 8086 with relevant block diagram. | 7M | 2 | 3 |
| | | **UNIT–III** | | | |
| 5. | a) | What is an A/D converter? Explain its interfacing with 8086 µP. | 7M | 3 | 2 |
| | b) | Write a program to interface stepper motor to 8086 microprocessor. | 7M | 3 | 2 |
| | | **OR** | | | |
| 6. | a) | What are maskable and non- maskable interrupts? Explain briefly. | 7M | 2 | 2 |
| | b) | Discuss in brief about the architecture and functioning of 8259A. | 7M | 2 | 3 |
| | | **UNIT–IV** | | | |
| 7. | | With the help of diagrams, explain the 8251 USART architecture and interfacing. | 14M | 3 | 4 |
| | | **OR** | | | |
| 8. | a) | Differentiate between synchronous and asynchronous data communications | 7M | 3 | 4 |
| | b) | Describe TTL to RS232C conversion. | 7M | 3 | 2 |
| | | **UNIT–V** | | | |
| 9. | a) | Tabulate the differences between 80286 and 80386 microprocessor. | 7M | 4 | 4 |
| | b) | Discuss in brief about Pentium processor. | 7M | 4 | 3 |
| | | **OR** | | | |
| 10. | a) | Analyze about the Protected mode in the advanced processors. | 7M | 4 | 4 |
| | b) | With the help of a block diagram explain the paging mechanism in 80386. | 7M | 4 | 2 |

***END***

| Hall Ticket Number : | | | | | | | | | | |
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**R-19**

**Code: 19A45BT**

III B.Tech. I Semester Regular Examinations February 2022

# 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 | Blooms Level |
|---|---|---|---|---|---|
| | | **UNIT-I** | | | |
| 1. | a) | Design a CMOS transistor circuit for 2-input N O R gate and explain its operation | 7M | CO1 | L6 |
| | b) | Explain Low voltage CMOS logic and interfacing | 7M | CO1 | L2 |
| | | **OR** | | | |
| 2. | a) | Draw and explain the circuit diagram of 2-input LS-TTL NAND gate | 8M | CO1 | L2 |
| | b) | Discuss CMOS/TTL interfacing? | 6M | CO1 | L2 |
| | | **UNIT-II** | | | |
| 3. | a) | Explain about Functions and procedures in VHDL. | 7M | CO2 | L2 |
| | b) | Discuss about the VHDL Packages and Libraries. | 7M | CO2 | L4 |
| | | **OR** | | | |
| 4. | | Explain about the VHDL operators with examples. | 14M | CO2 | L2 |
| | | **UNIT-III** | | | |
| 5. | a) | Distinguish variable and Signal assignment statements in VHDL. | 7M | CO3 | L4 |
| | b) | Explain about the Process statement in VHDL. | 7M | CO3 | L2 |
| | | **OR** | | | |
| 6. | a) | Distinguish Inertial delay and Transport delay model with example. | 7M | CO3 | L4 |
| | b) | Illustrate a VHDL model for 2 x 4 decoder. | 7M | CO3 | L4 |
| | | **UNIT-IV** | | | |
| 7. | a) | Design a 4-bit comparator using VHDL. | 7M | CO4 | L6 |
| | b) | Design binary to BCD code converter using VHDL. | 7M | CO4 | L6 |
| | | **OR** | | | |
| 8. | a) | Design a 4X1 Multiplexer using VHDL. | 7M | CO4 | L6 |
| | b) | Design a full adder using VHDL. | 7M | CO4 | L6 |
| | | **UNIT-V** | | | |
| 9. | a) | Analyze any shift register using VHDL. | 10M | CO5 | 6 |
| | b) | Distinguish between Latches and Flipflops | 4M | CO5 | L4 |
| | | **OR** | | | |
| 10. | a) | Discuss about Synchronous design methodology? | 7M | CO5 | L2 |
| | b) | Briefly explain Impediments to synchronous design? | 7M | CO5 | L2 |

***END***

| Hall Ticket Number : | | | | | | | | | | |
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**R-19**

**Code: 19A452T**

III B.Tech. I Semester Regular Examinations February 2022

# 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 ( 5x14 = 70 Marks )

*********

| | | Marks | CO | Blooms Level |
|---|---|---|---|---|
| | **UNIT-I** | | | |
| 1. a) | Define Antenna? With the help of neat diagram explain the basic radiation equation and principle of radiation mechanism in antennas. | 7M | CO1 | L3 |
| b) | Derive the far electric and magnetic field components of a halfwave diepole. | 7M | CO1 | L4 |
| | **OR** | | | |
| 2. a) | Define and explain directivity of an antenna and obtain the relationship between directivity and aperture of an antenna. | 7M | CO1 | L1 |
| b) | State and prove Reciprocity Theorem. | 7M | CO1 | L2 |
| | **UNIT-II** | | | |
| 3. a) | Explain the concept of pattern multiplication principle. Show its application with an example. | 7M | CO2 | L1 |
| b) | Explain the significances of Antenna Array. Derive an expression for antenna array factor. | 7M | CO2 | L2 |
| | **OR** | | | |
| 4. a) | Draw a Yagi Uda array and explain its construction and operating principle. | 7M | CO2 | L2 |
| b) | Obtain the Directivity expression for Broadside array. | 7M | CO2 | L3 |
| | **UNIT-III** | | | |
| 5. a) | Explain the construction and principle of horn antenna. | 7M | CO3 | L2 |
| b) | A pyramidal horn antenna having aperture dimensions of a=4.5 cm and b=3.2 cm is used at a frequency of 12 GHz. Calculate its gain, half power beam widths and effective area. | 7M | CO3 | L3 |
| | **OR** | | | |
| 6. a) | Draw the geometrical structure of Helical Antenna and Give the applications of the same antenna. | 7M | CO3 | L3 |

| | | | | | |
|---|---|---|---|---|---|
| | b) | A transmitting antenna and a receiving antenna are separated by a distance of $10^3$m. If the transmitting antenna radiates a power of 100W, calculate the available power at the receiving antenna if the D of transmitting antenna is 1.64 and effective area of receiving antenna is 0.25 $m^{2.}$ | 7M | CO3 | L4 |

**UNIT-IV**

| | | | | | |
|---|---|---|---|---|---|
| 7. | a) | Explain the ground waves propagation. | 7M | CO4 | L1 |
| | b) | Calculate the distance beyond which the earth's curvature to be accounted at frequency of i) 100KHz ii) 1MHz iii) 10MHz | 7M | CO4 | L2 |

**OR**

| | | | | | |
|---|---|---|---|---|---|
| 8. | a) | Discuss the different modes of propagation in detail. | 4M | CO4 | L1 |
| | b) | Explain the electric and magnetic field effects of earth in detail. | 7M | CO4 | L2 |
| | c) | Compare and contrast Ground wave, space waves and sky waves | 3M | CO4 | L2 |

**UNIT-V**

| | | | | | |
|---|---|---|---|---|---|
| 9. | a) | Draw the structure of Ionosphere with layers and their heights. | 7M | CO5 | L1 |
| | b) | With neat sketch, explain about Ray path, skip distance in Sky Wave propagation. | 7M | CO5 | L2 |

**OR**

| | | | | | |
|---|---|---|---|---|---|
| 10. | a) | Define MUF. Explain its significance. | 7M | CO5 | L1 |
| | b) | Write technical notes on<br>i .Multihop propagation ii. Virtual height. | 7M | CO5 | L3 |

****END****

| Hall Ticket Number : | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|

**R-19**

**Code: 19A454T**

III B.Tech. I Semester Regular Examinations February 2022

# 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 )

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| | | | Marks | CO | Blooms Level |
|---|---|---|---|---|---|
| | | **UNIT-I** | | | |
| 1. | a) | Draw the block diagram of digital communication system and explain each block in detail. | 7M | | |
| | b) | Find the output signal power due to Quantization noise in a PCM system. | 7M | | |
| | | **OR** | | | |
| 2. | a) | Consider a signal x(t), having $\|X_{max}\| = 16$, $\sigma_x^2 = 9$ and band-limited to 4kHz. Calculate the sampling rate and PCM data rate for $S/N_q \geq 40$dB. | 7M | | |
| | b) | With a neat block diagram, explain the operation of delta modulation system. | 7M | | |
| | | **UNIT-II** | | | |
| 3. | a) | Explain with neat diagrams coherent BFSK transmitter and receiver. Also explain single space diagram for coherent BFSK systems. | 7M | | |
| | b) | The bit stream d(t) is to be transmitted using DPSK. If d(t) is 001010011010. Determine b(t) and draw the waveforms. | 7M | | |
| | | **OR** | | | |
| 4. | a) | Draw and explain the operation of transmitter and receiver of a coherent FSK. | 7M | | |
| | b) | The bit stream 001010011010 is to be transmitted using BFSK. Sketch the transmitted waveform. | 7M | | |
| | | **UNIT-III** | | | |
| 5. | a) | What is mutual information? Derive mutual information I(*xi, yj*). | 6M | | |
| | b) | Calculate the bandwidth limits of Shannon-Hartley theorem. | 8M | | |
| | | **OR** | | | |
| 6. | a) | Explain Huff-man coding with an example. | 7M | | |
| | b) | Explain Shannon-Fano algorithm with an example. | 7M | | |
| | | **UNIT-IV** | | | |
| 7. | | Explain about block codes in which each block of k message bits encoded into block of n>k bits with an example. | 14M | | |
| | | **OR** | | | |
| 8. | | Prove $CH^T = 0$ where C is code word and H is parity check matrix. | 14M | | |
| | | **UNIT-V** | | | |
| 9. | | State and prove the important theorem of cyclic code to generate code polynomial $V(x) = r(x) + x^{n-k} D(x)$. | 14M | | |
| | | **OR** | | | |
| 10. | | For a non-systematic rate ½ code given by g(1,1)=(1,1,1), g(1,2)=(1,0,1) Draw the tree graph, trellis and state diagram. | 14M | | |

****END****