Hall Ticket Number :										

R-19

Code: 19A454T

III B.Tech. I Semester Supplementary Examinations July 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 a PCM system and explain each block in detail.	7M		
	b)	Derive an expression for channel noise and quantization noise in DM system.	7M		
		OR			
2.	a)	Derive the relation for signaling rate and transmission bandwidth in a PCM system.	7M		
	b)	What are the problems encountered in linear delta modulation and explain in detail.	7M		
		UNIT-II			
3.	a)	Show that the approximate transmission bandwidth for FSK is given by $B_T = 2R(1+h/2)$ where 'h' is the digital modulation index and 'R' is the bit rate.	7M		
	b)	Explain with neat block diagram the generation and recovery of DPSK signals.	7M		
		OR			
4.	a)	Write the comparisons among binary modulated band pass signaling scheme (ASK, PSK and FSK).	7M		
	b)	The bit stream 11011100101 is to be transmitted using DPSK. Determine the encoded sequence and the transmitted phase sequence.	7M		
		UNIT-III			
5.	a)	Explain the two important implications of Shannon-Hartley theorem.	6M		
	b)	An information sources produce sequences of independent symbols having the following probabilities.			

A	B	C	D	E	F	G
$1/3$	$1/27$	$1/3$	$1/9$	$1/9$	$1/27$	$1/27$

using Shannon-Fano procedure.

i. Construct a binary code.

ii. Determine the efficiency and redundancy. 8M

OR

6. Prove that the rate of information transfer over the channel capacity is given by Dt = [$H(X) - H(X|Y)$] rs bits/sec. 14M

UNIT-IV

7. The parity check bits of a (8, 4) block code are generated by

C5 = d1 + d2 + d4

C6 = d1 + d2 + d3

C7 = d1 + d3 + d4

C8 = d2 + d3 + d4

where d1, d2, d3 and d4 are message bits. Find:

(a) the generator matrix and parity check matrix for this code.

(b) the minimum weight of this code. 14M

OR

8. a) Show that the minimum Hamming distance of a linear block code is equal to the minimum number of columns of its parity check matrix that are linearly dependent show also that the minimum Hamming distance of a Hamming code is always equal to 3. 8M

b) Explain applications of block codes for error control in data storage systems. 6M

UNIT-V

9. Consider a (6, 3) generator matrix.

$$G = \left[\begin{array}{ccc|ccc} 1 & 0 & 0 & 0 & 1 & 1 \\ 0 & 1 & 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 1 & 1 & 0 \end{array}\right]$$

Find

(a) all the code vectors of this data.

(b) the parity check matrix for this code.

(c) the minimum weight of this code. 14M

OR

10. a) What is a convolution code? How it is generated. 7M

b) Explain in detail the convolution coder with a suitable diagram. 7M

END

Hall Ticket Number :										

R-19

Code: 19A453T

III B.Tech. I Semester Supplementary Examinations July 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)

****

			Marks	CO	Blooms Level
		UNIT–I			
1.	a)	(i) Determine the continuous time convolution of *x(t)* and *h(t).* $x(t)=u(t+1)-u(t-1),\ h(t)=u(t+1)-u(t-1)$ (ii) Find the Fourier series of the signal represented below. $x(t)=1+\sin \mu_0 t+2\cos \mu_0 t+2\cos\left(2\mu_0 t+\frac{®}{4}\right)$	7M	CO1	L4, L3
	b)	$X\left(e^{j0}\right)=\sum_{n=-\infty}^{\infty} x[n]$ Find the numerical value of $A=\sum_{n=0}^{\infty} n\left(\frac{1}{2}\right)^n$	7M	CO1	L3
		OR			
2.	a)	(i) Perform the circular convolution of the following two sequences: $x_1(n)=\{\boxed{2},1,2,1\},\quad x_2(n)=\{\boxed{1},2,3,4\}$ (ii) Explain Parseval's theorem in DFT.	7M	CO1	L3, L2
	b)	(i) Write the difference between linear convolution and circular convolution. (ii) Find the 4-point DFT of the sequence $x(n)=\cos\left(\frac{n®}{4}\right)$.	7M	CO1	L1, L3
		UNIT–II			
3.	a)	Explain how the IDFT can be computed through FFT algorithm.	7M	CO1	L5
	b)	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 DIT FFT algorithm.	7M	CO1	L4
		OR			
4.	a)	(i) Calculate the percentage saving in calculation in 256-point radix-2 FFT, compared to the direct FFT. (ii) Compare the radix-2 DIT FFT and DIF FFT.	7M	CO1	L4, L2
	b)	Compute the circular convolution of the following sequences using radix-2 DIT FFT algorithm. $x_1(n)=\{\boxed{1},2,1,2\},\quad x_2(n)=\{\boxed{4},3,2,1\}$	7M	CO1	L3
		UNIT–III			
5.	a)	For the mentioned below specification design a low pass IIR digital Butterworth filter using bilinear transformation $0.8\le H\left(e^{j\mu}\right)\le 1 \qquad 0\le \mu \le 0.3®$ $H\left(e^{j\mu}\right)\le 1 \qquad 0.6® \le \mu \le ®$	7M	CO2	L4

b) Explain mathematically how the signal can be detected buried in noise by using FIR filter. 7M CO2 L5

OR

6. a) (i) Compare between IIR and FIR filter?
(ii) How the best window is decided for design of FIR filter by windowing method?
(iii) What is Gibb's oscillation and how it can be avoided?
(iv) What is Butterworth filter? 7M CO2 L1, L5, L2, L1

b) Design an ideal differentiator with frequency response as mentioned below:

$$H\left(e^{j\mu}\right) = j\mu e^{\frac{-j\mu N}{2}} \qquad -® \le \mu \le ®$$

Use Hamming window with N=5. 7M CO2 L3

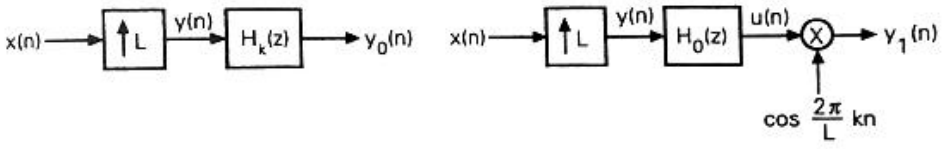
UNIT–I

7. a) Consider an i/p sequence $x(n) = \left(\frac{1}{2}\right)^n u(n)$ feed to the down sampler with a down sampling by a factor of 2. Determine the o/p spectrum $Y\left(e^{j\mu}\right)$. 7M CO3 L4

b) Proof that the up-sampler and down-sampler are linear. 7M CO3 L4

OR

8. a) Show that the two systems shown in below Fig. (Where k is some integer) are equivalent. Assume that $h_k(n) = h_0(n)\cos\left(\frac{2® nk}{L}\right)$.



7M CO3 L5

b) (i) Where multirate signal processing used?
(ii) What is fractional sampling rate conversion?
(iii) Find the relation between i/p and o/p of a fractional rate conversion. 7M CO3 L2, L3, L3

UNIT–I

9. a) Explain the idea behind signal compression. Explain briefly about one method for signal compression. 7M CO4 L2, L4

b) What are the differences between the stationary and non-stationary signals? What parameters are used to define the non-stationary signals and define them? 7M CO4 L1, L3

OR

10. a) (i) Considering an oversampling ADC system with maximum analog signal frequency of 4 kHz and ADC resolution of eight bits, determine the oversampling rate to improve the ADC resolution to 12-bit resolution. L4, L5
(ii) What information is obtained from the spectrum of the signal? 7M CO4 L1

b) Explain the different blocks musical sound processing. 7M CO4 L2

END

Hall Ticket Number :										

R-19

Code: 19A45FT

III B.Tech. I Semester Supplementary Examinations July 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.	Describe the different types of errors in measurement.	14M	CO1	L1
	OR			
2.	Explain the working ramp type & dual slope integrator based digital voltmeters.	14M	CO1	L2
	UNIT–II			
3.	Illustrate the working of sweep frequency generator and draw the relevant diagram.	14M	CO2	L2
	OR			
4.	Describe the wave analyzers principle.	14M	CO2	L2
	UNIT–III			
5.	Show the working mechanism of dual trace oscilloscope with the help of neat circuit diagram.	14M	CO3	L2
	OR			
6.	Elaborate the measurement procedure of the voltage and frequency using cathode ray oscilloscope.	14M	CO3	L4
	UNIT–IV			
7.	Explain the principle of Wheatstone bridge, also describe about guarded Wheatstone bridge.	14M	CO4	L4
	OR			
8.	Discuss the working principle of Q-meter	14M	CO4	L4
	UNIT–V			
9.	Explain the principle of strain gauge using neat diagram.	14M	CO5	L2
	OR			
10.	Describe the displacement transducer.	14M	CO5	L2

END

Hall Ticket Number :										

R-19

Code: 19A451T

III B.Tech. I Semester Supplmentary Examinations July 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)

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			Marks	CO	Blooms Level
		UNIT–I			
1.		With a neat sketch describe in detail the architecture and working of 8086 microprocessor.	14M	1	2
		OR			
2.	a)	Explain the physical memory organization in an 8086 system.	8M	1	2
	b)	Explain the following addressing modes of 8086 with suitable examples: (i) Direct addressing (ii) Immediate addressing	6M	1	2
		UNIT–II			
3.		Illustrate the pin configuration of 8086 microprocessor and explain about the	14M	2	4
		OR			
4.	a)	Discuss about the minimum mode operation of 8086 with relevant block diagram.	7M	2	3
	b)	What is DMA controller? Explain how DMA operations are performed.	7M	2	2
		UNIT–III			
5.		Draw and explain the architecture of 8255 and also explain the various modes of operation.	14M	3	2
		OR			
6.	a)	What are the advantages of 8259? With a neat sketch explain the interfacing of cascaded 8259s with 8086.	7M	2	3
	b)	Explain in detail about the interrupt structure of 8086.	7M	2	2
		UNIT–IV			
7.		Elaborate about i) TTL to RS232C conversion ii) RS232C to TTL conversion	14M	3	4
		OR			
8.	a)	Discuss the necessity of communication interfaces in detail.	7M	3	3
	b)	What is an 8253 programmable interval timer/counter? Explain its Architecture.	7M	3	2
		UNIT–V			
9.	a)	Distinguish between Pentium and Pentium pro processors.	7M	4	4
	b)	Write about the salient features of 80386.	7M	4	3
		OR			
10.	a)	Discuss in brief about Pentium Pro processor.	7M	4	3
	b)	What is the need of advanced processors, give suitable example with necessary diagram?	7M	4	3

END

Hall Ticket Number :										

R-19

Code: 19A45BT

III B.Tech. I Semester Supplementary Examinations July 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)

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			Marks	CO	Blooms Level
		UNIT-I			
1.	a)	Design a CMOS transistor circuit for 2-input X O R gate and explain its operation	7M	CO1	L6
	b)	Distinguish CMOS with TTL logic families.	7M	CO1	L4
		OR			
2.		Explain in detail about dynamic electrical behavior of CMOS.	14M	CO1	L2
		UNIT-II			
3.	a)	Explain component instantiation in VHDL?	4M	CO2	L2
	b)	Design a 16X1 Multiplexer with 4X1 Multiplexers.	10M	CO2	L4
		OR			
4.		Explain in detail about the operators in VHDL with examples?	14M	CO2	L2
		UNIT-III			
5.	a)	Analyze the various abstraction levels in VHDL	9M	CO3	L6
	b)	Distinguish concurrent and sequential signal assignment statements with an example.	5M	CO3	L4
		OR			
6.	a)	Explain delay models- Inertial delay model, Transport delay model with examples.	8M	CO3	L2
	b)	Design 3 to 8 decoder using case statement in VHDL.	6M	CO3	L4
		UNIT-IV			
7.	a)	Design a 4-bit comparator in behavior model using VHDL syntax.	8M	CO4	L4
	b)	Explain barrel shifter with neat diagram?	6M	CO4	L4
		OR			
8.		Design a 16- Bit-ALU which can perform minimum of 16 operations.	14M	CO4	L6
		UNIT-V			
9.	a)	Write a VHDL program for Master slave JK – FF.	10M	CO5	L2
	b)	Distinguish Latches and Flipflops	4M	CO5	L4
		OR			
10		Discuss about Synchronous design methodology?	14M	CO5	L4

END

Hall Ticket Number :										

R-19

Code: 19A441T

II B.Tech. II Semester Supplementary Examinations July/August 2022

Analog IC Applicaitons

(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)	Describe the internal block diagram of an Op-amp and explain each block in detail.	10M	CO1	L2
	b)	Draw and explain the pin diagram of Ic741.	4M	CO1	L2
		OR			
2.	a)	What is an IC? List out the IC Classifications and Explain	8M	CO1	L1
	b)	Design a non-inverting Op Amp with gain -120.	6M	CO1	L6
		UNIT–II			
3.	a)	Illustrate the operation of Subtractor circuit using IC 741.	7M	CO2	L3
	b)	Explain the operation of current to voltage converter using Op-Amp.	7M	CO2	L2
		OR			
4.	a)	Examine the output of Op-amp integrator circuit for an applied unit step input and sine input signal	7M	CO2	L1
	b)	Illustrate the operation of basic Integrator circuit using op-amp	7M	CO2	L3
		UNIT–III			
5.	a)	Illustrate the operation of Schmitt Trigger circuit using IC 741.	7M	CO3	L3
	b)	Explain the operation of Precision Half-wave Rectifier.	7M	CO3	L2
		OR			
6.	a)	Explain how astable multivibrator can be used as Square wave generator.	9M	CO3	L4
	b)	Design an astable multivibrator for output frequency of 1KHz	5M	CO3	L6
		UNIT–IV			
7.	a)	Explain the basic principle of operation using block schematic of a PLL.	8M	CO4	L2
	b)	Discuss how PLL can be used for AM demodulation.	6M	CO4	L2
		OR			
8.		List the applications of astable multivibrator and explain in detail.	14M	CO4	L1
		UNIT–V			
9.	a)	What is the main disadvantage of Flash ADC? And With the help of a neat diagram explain its operation.	8M	CO5	L2
	b)	With help of neat diagram explain the operation of counter type ADC.	6M	CO5	L2
		OR			
10.		Classify the types of ADC and Explain the principle of operation of dual-Slope ADC with necessary diagrams.	14M	CO5	L4

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Hall Ticket Number :										

R-19

Code: 19A452T

III B.Tech. I Semester Supplementary Examinations July 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)

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			Marks	CO	Blooms Level
		UNIT-I			
1.	a)	Explain the development of dipole antenna from a transmission line, with a diagram.	5M	CO1	L1
	b)	Derive the field components of HWD and hence obtain its radiation resistance.	5M	CO1	L2
	c)	Compute the directivity of a current element Idl.	4M	CO1	L4
		OR			
2.	a)	Define and explain the parameters of an antenna.	4M	CO1	L1
	b)	Compute the effective area of a pyramidal horn antenna with an example.	5M	CO1	L2
	c)	Explain the field regions for antenna measurements, with a neat diagram.	5M	CO1	L2
		UNIT-II			
3.	a)	Explain the significance of antenna array factor. Derive an expression for antenna array factor.	4M	CO2	L1
	b)	Distinguish 1. BEA from EFA	5M	CO2	L2
	c)	Explain the structure of Yagi Uda array. Bring out its design details	5M	CO2	L2
		OR			
4.	a)	Mathematically prove that the 3dB beam width of EFA is greater than that of 3 dB beam width of BSA.	5M	CO2	L2
	b)	Explain how the folded dipole geometry is fabricated from transmission lines, with diagrams.	5M	CO2	L3
	c)	Derive the Zin of folded dipole antenna	4M	CO2	L4
		UNIT-III			
5.	a)	State and explain Babinet's principle for aperture antennas.	5M	CO3	L1
	b)	Explain offset feed reflector geometry with ray diagram. For a parabolic reflector of diameter 6m, illumination efficiency $\eta = 0.65$, the frequency of operation is 10GHz, find its beam width, directivity and capture area.	5M	CO3	L2
	c)	Define and explain 1.Shadowing 2. f/d ratio	4M	CO3	L3
		OR			
6.	a)	Differentiate Primary radiator from secondary radiator	4M	CO3	L1
	b)	Explain the construction and principle of pyramidal horn antenna.	5M	CO3	L2
	c)	A pyramidal horn antenna having aperture dimensions of a=5.2cm and b= 3.8cm is used at a frequency of 10 GHz. Calculate its gain and half power beam widths.	5M	CO3	L3

UNIT-IV

7.	a)	Discuss the factors involved in the propagation radio waves.	4M	CO4	L1
	b)	Explain the advantages, limitations and applications of Ground waves.	5M	CO4	L2
	c)	Differentiate ground waves from Space waves.	5M	CO4	L2

OR

8.	a)	Derive the electric field intensity of ground waves along the surface of earth.	10M	CO4	L3
	b)	Why the waves are to be vertically polarized in surface wave propagation? Justify your answer.	4M	CO4	L4

UNIT-V

9.	a)	Explain two-ray model of tropospheric wave propagation. Derive the electric field intensity at the receiving antenna.	7M	CO4	L2
	b)	At a 300Km height in ionosphere, the electron density at night is about $3 \times 10^{12} m^{-3}$ and the signal MUF is $f = 2f_{cr}$ for a transmission distance of 600Km. Compute $f_{cv}, \varepsilon_r, \eta, \beta, V_p, V_g$ and θ_i.	7M	CO4	L3

OR

10.	a)	Draw the ionospheric profile diagram of sky wave propagation and explain.	7M	CO4	L2
	b)	Derive the characteristic equations of ionosphere and explain them.	7M	CO4	L3

END