Hall Ticket Number :										

R-20

Code: 20A441T

II B.Tech. II Semester Supplementary Examinations Dec 2022 / Jan 2023

Linear IC Applications

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. In Part-A, each question carries **Two mark.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

			CO	Blooms Level
1.	**Answer ALL the following short answer questions**	(5 X 2 = 10M)		
a)	List the AC characteristics of op-amp.		CO1	L1
b)	Draw the op-amp integrator circuit.		CO2	L6
c)	Give some limitations of op-amp as a comparator.		CO3	L3
d)	Describe the key components of PLL.		CO4	L2
e)	List the applications of ADC?		CO5	L1

PART-B

Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

			Marks	CO	Blooms Level
		UNIT–I			
2.	a)	Discuss the various AC and DC characteristics of an op-amp?	6M	CO1	L2
	b)	Explain what is an integrator circuit? Discuss the relative advantages and disadvantages if IC'S over discrete assembly.	6M	CO1	L2
		OR			
3.	a)	Draw the block schematic of an op-amp and explain the functions of each block.	6M	CO1	L6
	b)	Compare and contrast ideal and practical op-amp?	6M	CO1	L2
		UNIT–II			
4.	a)	Explain the working of non-Inverting amplifier with a neat diagram.	6M	CO2	L2
	b)	Draw and explain about adder-subtractor circuit using op-amp.	6M	CO2	L3
		OR			
5.	a)	Discuss how op-amp is used as a differentiator?	6M	CO2	L2

	b)	Describe how an op-amp can be used as integrator? Also derive expression for the output.	6M	CO2	L3

UNIT–III

6.	a)	Explain the working of a Schmitt trigger with neat circuit diagram.	6M	CO3	L2
	b)	Write short notes on: Log and Antilog amplifier	6M	CO3	L6

OR

7.	a)	Compare and contrast saw tooth and triangular wave generator.	6M	CO3	L2
	b)	With neat diagram explain how op-amp can be used for comparator.	6M	CO3	L3

UNIT–IV

8.	a)	Write notes on applications of PLL.	6M	CO4	L6
	b)	Draw the functional block diagram of 565IC and explain its working.	6M	CO4	L3

OR

9.	a)	Discuss FSK modulation with necessary block diagram.	6M	CO4	L2
	b)	Deliberate the working of an Astable multivibrator using IC555 with circuit diagram	6M	CO4	L3

UNIT–V

10.	a)	Write notes on A/D converters.	6M	CO5	L6
	b)	Describe the working of R-2R ladder DAC with neat circuit diagram and write its limitations.	6M	CO5	L2

OR

11.	a)	Explain the working of dual slope ADC with neat circuit diagram.	6M	CO5	L2
	b)	Sketch and explain the transfer characteristic of a DAC with necessary equations.	6M	CO5	L3

*** End ***

Hall Ticket Number :										

R-20

Code: 20AC42T

II B.Tech. II Semester Supplementary Examinations Dec 2022 / Jan 2023

Numerical Methods and Random Variables

(Common to EEE & ECE)

Max. Marks: 70 Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. In Part-A, each question carries **Two mark.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

		CO	Blooms Level
1.	**Answer ALL the following short answer questions** (5 X 2 = 10M)		
a)	Find the missing term in the following data:	C01	L1

x:	2	3	4	5	6
y:	45.0	49.2	54.1	---	67.4

b)	Given $\frac{dy}{dx} = x + y$ with initial condition $y = 1$ at $x = 0$; find y for $x = 0.1$ by Euler's method. Use $h = 0.05$.	C02	L1
c)	Write the empirical relation between mean, median and mode.	C03	L2
d)	A pair of dice is tossed twice. Find the probability of scoring 7 points twice.	C04	L1
e)	Determine the probability of getting 9 exactly twice in 3 throws with a pair of fair dice.	C05	L3

PART-B

Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

		Marks	CO	Blooms Level
	UNIT–I			
2. a)	By the bisection method, find an approximate root of the equation $\sin x = \frac{1}{x}$, that lies between $x = 1$ and $x = 1.5$ (measured in radians). Carry out the computations up to 5th stage.	6M	CO1	L1
b)	Determine the cubic polynomial which takes the following values:			

x:	0	1	2	3
$f(x)$:	1	2	1	10

Hence calculate $f(4)$. 6M CO1 L3

OR

3. a)	Find a real root of the equation $x \log_{10} x = 1.2$ by regula-falsi method correct to four decimal places.	6M	CO1	L1
b)	Use Lagrange's interpolation formula to determine the value of y when $x = 10$, if the following values of x and y are given:			

x:	5	6	9	11
y:	12	13	14	16

6M CO1 L3

UNIT–II

4. a)	Solve $\int_0^{\epsilon} \frac{dx}{1+x^2}$ by using Trapezoidal rule.	6M	CO2	L3

b) Solve $\frac{dy}{dx} = \log(xy)$ for $y(1.$ l) and $y(1.$ 2), given $y(1)$ = 2, by using Taylor's series method. 6M CO2 L3

OR

5. a) Use Simpson's 1/3 rule to find $\int_0^{\cdot}$ $e^{-x^2}dx$ by tak ing seven ordinates. 6M CO2 L1

b) Us e Si mpson's 1/3 r ler's method, determine ng s 2) and nate 1) given $y' = y + ex$, y(0)=0. $y(0.$ $y(0.$ 6M CO2 L3

UNIT–III

6. Determine mean, median and standard deviation for the following distribution:

Mid Value	15	20	25	30	35	40	45	50	55
Frequency	2	22	19	14	3	4	6	1	1

12M CO3 L3

OR

7. Determine the correlation coefficient for the following data:

atio x:	1	2	3	4	5
atio x: y:	2	5	3	8	7

12M CO3 L3

UNIT–IV

8. A box I contains four tickets numbered 1, 2, 3, 4 and another box II contains six tickets numbered 2, 4, 6, 7, 8, and 9. If one of the two boxes is chosen at random and a ticket is drawn at random from the chosen box, find the probabilities that the ticket drawn is numbered (i) 2 or 4 (ii) 3 (iii) 1 or 9. 12M CO4 L2

OR

9. Suppose a continu awn f n R th C ous R.V. x has e pr bability density

$$f(x) = \begin{cases} k(1 - x^2) & for\ 0 < x < 1 \\ 0 & elsewhere \end{cases}$$

(a) Find k (b) Find $P(0.1 < x < 0.2)$ (c) $P(x > 0.5)$ Using distribution function, determine the probabilities that (d) x is less than 0.3 (e) between 0.4 and 0.6 (f) Calculate mean and variance for the probability density function. 12M CO4 L2

UNIT–V

10. a) The probability that a pen manufactured by a company will be defective is 0.1. If 12 such pens are examined, determine the probability that (a) exactly two (b) at least two will be defective. 6M CO5 L3

b) Determine the probability *p* that there are 3 defective items in a sample of 100 items if 2% of items made in this factory are defective. 6M CO5 L3

OR

11. A university awards distinction, first class, second class, third class or pass class according as the student gets 80% or more; 60% or more; between 45% and 60%; between 30% and 45%; or 30% or more marks respectively. If 5% obtained distinction and 10% failed, determine the percentage of students getting second class. Assume that marks X are normally distributed. 12M CO5 L3

*** End ***

Hall Ticket Number :										

R-20

Code: 20A444T

II B.Tech. II Semester Supplmentary Examinations Dec 2022 / Jan 2023

Advanced Digital Design Concepts

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. In Part-A, each question carries **Two mark.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

		CO	Blooms Level
1.	**Answer ALL the following short answer questions** (5 X 2 = 10M)		
a)	How many NAND gates are used in a CMOS Inverter?	CO1	L1
b)	What is a Data object?	CO2	L1
c)	In short differentiate between Dataflow & Behaviour Model.	CO3	L2
d)	What is a Barrel shift register?	CO4	L1
e)	Write the differences between latches and flipflops.	CO5	L2

PART-B

Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

		Marks	CO	Blooms Level
	UNIT–I			
2. a)	Realize a CMOS transistor circuit for 2-input NOR gate and explain its working.	6M	CO1	L3
b)	Explain about CMOS logic families.	6M	CO1	L1
	OR			
3. a)	Explain about CMOS dynamic electrical behaviour.	6M	CO1	L1
b)	Discuss about CMOS/TTL interfacing.	6M	CO1	L2
	UNIT–II			
4. a)	Draw and explain about VHDL Design flow.	6M	CO2	L2
b)	Briefly discuss about Structural design elements.	6M	CO2	L1
	OR			
5.	Explain in detail about Component declaration and Component Instantiation.	12M	CO2	L1

UNIT–III

6.	a)	Distinguish variable and Signal assignment statements in VHDL.	6M	CO3	L2
	b)	Explain about the variable assignment statement in VHDL.	6M	CO3	L1
		OR			
7.		Explain in detail about the Delay models.	12M	CO3	L1

UNIT–IV

8.	a)	Design any Demultiplexer using VHDL.	6M	CO4	L4
	b)	Design binary to gray code converter using VHDL	6M	CO4	L4
		OR			
9.	a)	Design any one code converter of your choice using VHDL	6M	CO4	L4
	b)	Design a full adder using VHDL.	6M	CO4	L4

UNIT–V

10.	a)	What is a shift register? Design any Shift register using VHDL.	6M	CO5	L3
	b)	Design D-Flip Flop using VHDL	6M	CO5	L4
		OR			
11.	a)	Design JK-Flip Flop using VHDL	6M	CO5	L4
	b)	Explain in brief about Impediments to synchronous design.	6M	CO5	L1

*** End ***

Hall Ticket Number :										

R-20

Code: 20A442T

II B.Tech. II Semester Supplementry Examinations Dec 2022 / Jan 2023

Communication Systems

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. In Part-A, each question carries **Two mark.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

		CO	Blooms Level
1.	**Answer ALL the following short answer questions** (5 X 2 = 10M)		
a)	What are the disadvantages of double side band full carrier system?	CO1	L1
b)	State Carson rule	CO2	L1
c)	Compare different pulse modulation schemes.	CO3	L3
d)	Write the quantization noise and signal to noise ratio of PCM system	CO4	L1
e)	Plot the BPSK signal for the given sequence 0010110010.	CO5	L1

PART-B

Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

		Marks	CO	Blooms Level
	UNIT–I			
2. a)	With the help of block diagram explain the elements of communication system.	6M	CO1	L2
b)	Define under-modulation and over-modulation. Explain why over modulation is undesirable?	6M	CO1	L2
	OR			
3. a)	Draw the block diagram for generation of DSB-SC wave using two AM modulators. A DSB-SC wave is demodulated using coherent detector. Evaluate the effect of frequency error in local carrier frequency of detector.	6M	CO1	L4
b)	Write a short notes on COSTAS Loop.	6M	CO1	L1
	UNIT–II			
4. a)	Explain FM Threshold effect	6M	CO2	L2
b)	Explicate Armstrong method of generation of FM signal.	6M	CO2	L2
	OR			
5. a)	Explain the generation of Narrow band Frequency Modulation with suitable block diagram.	6M	CO2	L2
b)	Compare AM and FM	6M	CO2	L3

UNIT–III

6.	a)	Describe the generation and demodulation of PAM	6M	CO3	L3
	b)	With the aid of the block diagram, briefly explain Frequency division multiplexing.	6M	CO3	L3

OR

7.	a)	Explain the generation of PPM.	6M	CO3	L2
	b)	Demonstrate the generation of PWM with a neat circuit diagram	6M	CO3	L4

UNIT–IV

8.	a)	With neat block diagram , explain the PCM communication system	6M	CO4	L3
	b)	Give the comparison of DPCM and DM with standard PCM.	6M	CO4	L3

OR

9.	a)	Explain delta modulation in detail with a suitable diagram	6M	CO4	L2
	b)	A television signal with a bandwidth of 4.2 MHz is transmitted using binary PCM. The number of quantization levels is 512. Calculate the transmission bandwidth and output SNR.	6M	CO4	L3

UNIT–V

10.		Explain coherent generation and detection of BFSK signals and derive the expression for probability of error.	12M	CO5	L2

OR

11.	a)	Elucidate the operation of DPSK with the help of neat diagram.	6M	CO5	L3
	b)	Describe the generation and coherent detection of Amplitude Shift Keying (ASK) signal.	6M	CO5	L2

*** End ***

Hall Ticket Number :										

R-20

Code: 20A443T

II B.Tech. II Semester Supplementary Examinations Dec 2022 / Jan 2023

Electromagnetic Theory

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. In Part-A, each question carries **Two mark.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

			CO	Blooms Level
1.	**Answer ALL the following short answer questions**	(5 X 2 = 10M)		
a)	State divergence & Stoke's theorem		1	L2
b)	Write down the Maxwell's equations for steady fields in integral form.		2	L1
c)	What is polarization in Dielectrics		3	L1
d)	State Ampere's circuital law.		4	L1
e)	List out various types of EM waves based on modes of propagation		5	L4

PART-B

Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

			Marks	CO	Blooms Level
		UNIT–I			
2.	a)	Determine the cylindrical and spherical coordinates of the following vectors: i. D = (x+z) ay ii. E = (y2 –x 2) aX + xyz ay + (x2 -z 2) az 4M	6M	CO1	L1
	b)	Define co-ordinate system? Explain different types of co-ordinate systems.	6M	CO1	L2
		OR			
3.	a)	Define divergence, gradient and curl in rectangular , cylindrical and spherical coordinate system with mathematical expressions	6M	CO1	L3
	b)	A point Charge of Q=60nc is located at the origin of a Cartesian coordinate system. Find the electric flux density D at (4,7,-8)	6M	CO1	L2
		UNIT–II			
4.	a)	State Gauss's law and explain any two applications of gauss law.	6M	CO2	L1
	b)	Explain in detail about different types of charge distributions	6M	CO2	L3

OR

5.	a)	Define Electric flux Density? Derive Electric flux density and electric filed intensity for surface charge.	6M	CO2	L4
	b)	Point charges 1mC and -2mC are located at (3, 2, -1) and (-1, -1, 4) respectively. Calculate the electric force on a 10nC charge locate at (0, 3, 1) and the electric field intensity at that point	6M	CO2	L2

UNIT–III

6.	a)	Derive the equation for Continuity equation and relaxation time	6M	CO3	L2
	b)	Define the following terms (i) Isotropic dielectric (ii) Homogeneous dielectric (iii) Dielectric constant	6M	CO3	L1

OR

7.	a)	Explain & derive the boundary conditions for conductor-Dielectric interface for static electric fields	6M	CO3	L3
	b)	Define and derive the relation between E and V	6M	CO3	L3

UNIT–IV

8.	a)	State The Law required to calculate magnetic fluex density or magentic field intensity for a given current or current distribution and derive the expression for the same	6M	CO4	L4
	b)	Differentiate scalar and vector magnetic potentials.	6M	CO4	L3

OR

9.	a)	State Ampere's circuit law and explain any one of its applications	6M	CO4	L2
	b)	Explain Maxwell's equations in final forms.	6M	CO4	L1

UNIT–V

10.	a)	State and prove poynting vector and poynting theorem	6M	CO5	L1
	b)	Explain the wave propagation in lossy dielectrics?	6M	CO5	L4

OR

11.	a)	Write short Notes on i) Total internal reflection ii) Brewster Angle	6M	CO5	L2
	b)	Explain about Reflection and Refraction of Plane Waves	6M	CO5	L2

*** End ***