Hall Ticket Number :										

R-20

Code: 20A444T

II B.Tech. II Semester Regular Examinations August 2022

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 transisters are used in a CMOS Inverter?	CO1	L2
b)	Write any two data types.	CO2	L1
c)	What are the two delay models?	CO3	L1
d)	What are three state devices?	CO4	L1
e)	Explain in short about a latch.	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)	Design a CMOS transistor circuit for 2-input NAND gate and explain its operation	6M	CO1	L4
b)	Tabulate the differences between various logic families.	6M	CO1	L2
	OR			
3. a)	With the help of a neat circuit diagram, explain the 2-input LS-TTL NAND gate.	6M	CO1	L2
b)	Discuss in brief about TTL families.	6M	CO1	L2
	UNIT–II			
4. a)	Write about the Data types in VHDL.	6M	CO2	L2
b)	Discuss about the various functions and procedures available in VHDL.	6M	CO2	L2
	OR			
5.	Enumerate the various VHDL operators with necessary examples.	12M	CO2	L3

UNIT–III

6.	a)	Distinguish between concurrent and sequential signal assignment statements in VHDL.	6M	CO3	L2
	b)	Explain about the Process statement in VHDL.	6M	CO3	L2

OR

7.	a)	Discuss about i) Wait Statement ii) If Statement	6M	CO3	L2
	b)	Design a VHDL model for 3 x 8 decoder.	6M	CO3	L4

UNIT–IV

8.	a)	Design a Full subtractor using VHDL.	6M	CO4	L4
	b)	Design binary to Gray code converter using VHDL	6M	CO4	L4

OR

9.	a)	Design a 4X1 Multiplexer using VHDL	6M	CO4	L4
	b)	Design a comparator using VHDL.	6M	CO4	L4

UNIT–V

10.	a)	What is Counter? Design a Counter using VHDL.	6M	CO5	L3
	b)	Design JK-Flip Flop using D-Flip Flop.	6M	CO5	L4

OR

11.		Elaborate about Synchronous design methodology with necessary diagrams.	12M	CO5	L2

*** End ***

Hall Ticket Number :										

R-20

Code: 20A442T

II B.Tech. II Semester Regular Examinations August 2022

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)	Define Modulation index and percent modulation for an AM wave.	CO1	L1
b)	What is frequency modulation and write the expression for instantaneous frequency?	CO2	L1
c)	What is Multiplexing?	CO3	L1
d)	What is the role of regenerative repeaters in PCM?	CO4	L1
e)	Differentiate various digital modulation schemes.	CO5	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)	Explain the coherent detection of DSB-SC Modulated waves	6M	CO1	L2
b)	A 500 W carrier is amplitude modulated to a depth of 75%. Calculate the total power in case of SSB technique. How much power saving is achieved for SSB compared to AM and DSBSC?	6M	CO1	L1
	OR			
3. a)	Describe the time domain band-pass representation of SSB with necessary sketches	6M	CO1	L3
b)	What are the applications of Modulation? Explain in detail.	6M	CO1	L2
	UNIT–II			
4.	Explain demodulation of FM signal with the help of S-curve method.	12M	CO2	L2
	OR			
5. a)	Explain FM generation using indirect method.	6M	CO2	L2

	b)	Give the bandwidth relationship using Carson's rule in FM.	6M	CO2	L1

UNIT–III

6.	a)	Draw and explain the block diagram of TDM system	6M	CO3	L2
	b)	Explain the generation of PPM signals	6M	CO3	L2

OR

7.	a)	Explain Pulse amplitude modulation in detail.	6M	CO3	L2
	b)	Give comparison of PAM, PWM and PPM.	6M	CO3	L3

UNIT–IV

8.	a)	With the help of block diagram explain the elements of digital communication systems.	9M	CO4	L2
	b)	Explain about Uniform and Non-Uniform Quantization?	3M	CO4	L2

OR

9.	a)	Draw the block diagram and explain the Delta modulation and demodulation system	6M	CO4	L3
	b)	Derive the expression for quantization noise in DM.	6M	CO4	L4

UNIT–V

10.	a)	Discuss about the Coherent Detection of Frequency Shift Keying	6M	CO5	L3
	b)	Explain generation and detection of DPSK signals	6M	CO5	L3

OR

11.	a)	Describe the generation and coherent detection of Amplitude Shift Keying (ASK) signal.	6M	CO5	L3
	b)	Illustrate the of BPSK system and discuss its bandwidth requirements	6M	CO5	L4

*** End ***

Hall Ticket Number :										

R-20

Code: 20A443T

II B.Tech. II Semester Regular Examinations August 2022

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 Gauss's law.	1	L2
b)	Define Energy Density	2	L1
c)	State Dielectric Constant	3	L1
d)	What is Faraday's Law.	4	L1
e)	List out the applications of Poynting theorem.	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)	Write short notes on 3 coordinate systems Rectangular, cylindrical and spherical coordinate systems	6M	CO1	L1
b)	Define electric field intensity in terms of point charge and describe its salient features.	6M	CO1	L2
	OR			
3. a)	Write a short note on following: i) Stoke's theorem ii) Divergence theorem	6M	CO1	L3
b)	Explain any 2 different methods of Del operator and its operations	6M	CO1	L2
	UNIT–II			
4. a)	State and explain Coulomb's law? Obtain an expression of it in vector form.	6M	CO2	L1
b)	Relationship between E and V and describe its Maxwell's equations.	6M	CO2	L3
	OR			

5.	a)	Derive Coulomb's law using Gauss's law.	6M	CO2	L4
	b)	Derive the expression for energy density.	6M	CO2	L2

UNIT–III

6.	a)	Define linear, isotropic and homogeneous dielectrics.	6M	CO3	L2
	b)	State and prove Continuity equation.	6M	CO3	L1

OR

7.	a)	Derive the capacitance of coaxial cable having the inner conductor radius 'a' and outer conductor radius 'b'.	6M	CO3	L3
	b)	Explain the polarization in dielectrics, dielectric constant & strength.	6M	CO3	L3

UNIT–IV

8.	a)	State and prove biot savart's law ,using Biot savart's law derive an expression for magnetic field strength H due to a finite &Infinite filamentary conductor carrying a current I and placed along Z-axis at appoint P on Y–axis .hence deduce the magnetic field strength for the length of the conductor extending from -∞+∞.	6M	CO4	L4
	b)	Derive the force equations due to current element.	6M	CO4	L3

OR

9.	a)	Define and Explain Ampere's circuit Law	6M	CO4	L2
	b)	State Maxwell's 4 Equations in Differential and Integral form with clear statement for static fields	6M	CO4	L1

UNIT–V

10.	a)	State and prove pointing theorem and pointing vector.	6M	CO5	L1
	b)	Write short notes on normal incidence of a plane wave on a perfect dielectric	6M	CO5	L4

OR

11.	a)	Explain the various applications of smith chart in Transmission line?	6M	CO5	L2
	b)	Explain wave propagation mechanism in detail	6M	CO5	L2

*** End ***

Hall Ticket Number :										

R-20

Code: 20A441T

II B.Tech. II Semester Regular Examinations August 2022

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)

1. Answer ALL the following short answer questions (5 X 2 = 10M)	CO	Blooms Level
a) Draw the equivalent circuit of an ideal OP-AMP.	CO1	L1
b) List the important features of an instrumentation amplifier.	CO2	L6
c) Give some applications of op-amp as a comparator.	CO3	L3
d) Define capture range and lock in range of a PLL.	CO4	L2
e) List the various types of ADCs	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)	Draw the block diagram of an operational amplifier and discuss each block.	6M	CO1	L6
b)	Differentiate ideal and practical op-amp with circuit diagram.	6M	CO1	L2
	OR			
3.	Discuss the various DC characteristics of an op-amp?	12M	CO1	L2
	UNIT–II			
4. a)	With help of circuit diagram 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
	OR			

5.	a)	With the diagram, summarize the working of non-Inverting amplifier.	6M	CO2	L2
	b)	Explain adder-subtractor circuit using op-amp with help of circuit diagram.	6M	CO2	L3

UNIT–III

6.	a)	Describe the working of a Schmitt trigger with neat circuit diagram.	6M	CO3	L2
	b)	With neat diagram explain how op-amp can be used for comparator.	6M	CO3	L3

OR

7.	a)	Compare and contrast saw tooth and triangular wave generator.	6M	CO3	L2
	b)	Write short notes on: Log and Antilog amplifier	6M	CO3	L6

UNIT–IV

8.	a)	Draw and explain the circuit of mono stable multivibrator using 555 timer	6M	CO4	L3
	b)	Deliberate the working of an Astable multivibrator using IC555 with circuit diagram	6M	CO4	L3

OR

9.	a)	Write short notes on applications of PLL.	6M	CO4	L6
	b)	Explain the working of IC565 and illustrate the functional block diagram.	6M	CO4	L3

UNIT–V

10.		Describe the working of dual slope ADC with circuit diagram.	12M	CO5	L2

OR

11.	a)	Write notes on Analog to Digital converters.	6M	CO5	L6
	b)	Illustrate with a neat diagram the working of R-2R ladder DAC and mention its limitations.	6M	CO5	L2

*** End ***

Hall Ticket Number :										

R-20

Code: 20AC42T

II B.Tech. II Semester Regular Examinations August 2022

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)

		Marks	CO	Blooms Level
1.	**Answer ALL the following short answer questions** (5 X 2 = 10M)			
a)	Find the missing term in the following data:		CO1	L1

	0	1	2	3	4
	1	3	9	…	81

b)	Given $\frac{dy}{dx} = 1 - y$ with initial condition $y = 0$ at $x = 0$; find y for $x = 0.2$ by Euler's method. Use $h = 0.05$.		CO2	L1
c)	Find the mode of the numbers 7, 7, 7, 9, 10, 11, 11, 11, 11, 12.		CO3	L2
d)	State the Addition Law of Probability.		CO4	L1
e)	The average number of phone calls/minute coming into a switch board between 2 and 4 PM is 2.5. Determine the probability that during one particular minute there will be 2 calls.		CO5	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)	Find the root of the equation $\cos x = xe^x$ using regula-falsi method correct to four decimal places.	6M	CO1	L1
b)	From the following table predict the number of students who obtained marks between 40 and 45.			

Marks	30-40	40-50	50-60	60-70	70-80
No. of students	31	42	51	35	31

6M CO1 L3

OR

3. a)	Find the positive root of $x^3 - x = 1$ correct to three decimal places, using Newton – Rapson method.	6M	CO1	L1
b)	Determine the polynomial $f(x)$ by using Lagrange's formula and hence find $f(3)$ for			

x:	0	1	2	5
$f(x)$:	2	3	12	147

6M CO1 L3

UNIT–II

4. a)	Use the Trapezoidal rule to calculate the integral $\int_0^{\frac{1}{2}} e^{x^2} dx$ taking 10 intervals.	6M	CO2	L3

b) Using modified Euler's method, determine $y(0.1)$ and $y(0.2)$ for the given equation $\frac{dy}{dx} = x^2 + y^2$, given that $y(0) = 1$. 6M CO2 L3

OR

5. a) Determine $\int_0^{\pi} \frac{dx}{1+x^2}$ by using Simpson's 3/8 rule. 6M CO2 L3

b) Using Runge-Kutta method of order 4, calculate y for $x = 0.1, 0.2$, given that $\frac{dy}{dx} = xy + y^2, y(0) = 1$. 6M CO2 L3

UNIT–III

6. The following table shows the marks obtained by 100 candidates in an examination. Calculate the mean, median and mode:

Marks Obtained	1-10	11-20	21-30	31-40	41-50	51-60
No. of candidates	3	16	26	31	16	8

12M CO3 L3

OR

7. Determine the correlation coefficient for the following data:

	2	4	6	8	10
	5	7	9	8	11

12M CO3 L3

UNIT–IV

8. Two marbles are drawn in succession from a box containing 10 red, 30 white, 20 blue and 15 orange marbles, with replacement being made after each drawing. Find the probability that (a) both are white (b) first is red and second is white (c) neither is orange. 12M CO4 L2

OR

9. A random variables X has the following probability function:

x	0	1	2	3	4	5	6	7
P(x)	0	K	2K	2K	3K	K^2	$2K^2$	$7K^2+K$

Determine: (i) K (ii) Evaluate P(X<6), P($X \geq 6$), P(0<X<5) and P($0 \leq X \leq 4$) (iii) If P($X \leq K$)>$\frac{1}{2}$, find the minimum value of K and (iv) Determine the distribution function of X (v) Mean (vi) variance. 12M CO4 L5

UNIT–V

10. a) The probability of a man hitting a target is 1/3. (i) If he fires 5 times, what is the probability of his hitting the target at least twice? (ii) How many times must he fire so that the probability of his hitting the target at least once is more than 90%? 6M CO5 L3

b) In a factory producing blades, the probability of any blade being defective is 0.002. If blades are supplied in packets of 10, determine the number of packets containing (i) no defective (ii) one defective blades respectively in a consignment of 10000 packets. 6M CO5 L3

OR

11. a) If X is a normal variate with mean 30 and standard deviation 5. Find the probabilities that (i) $26 \leq X \leq 40$ (ii) $X \geq 45$. 6M C05 L1

b) Fit a binomial distribution to the following data

x	0	1	2	3	4	5
f	2	14	20	34	22	8

6M C05 L1

*** End ***