Hall Ticket Number :										

R-20

Code: 20A432T

II B.Tech. I Semester Supplementary Examinations July 2023

Digital Logic Design

(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 marks.**
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	BL
a)	Determine the value of base x if $(211)_x = (152)_8$		CO1	L1
b)	Design 2x4 decoder using NAND gates		CO2	L3
c)	Write the differences between the Combinational and sequential circuits.		CO3	L2
d)	What are the classifications of sequential circuits?		CO3	L1
e)	Define state and state diagram.		CO4	L1

PART-B

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

			Marks	CO	BL
		UNIT–I			
2.	a)	Subtract the following decimal numbers by the 9's and 10's complement methods. i) 93 - 615 ii) 574.6 - 297.7 iii) 376.3 - 765.6	6M	CO1	L2
	b)	Reduce the following Boolean function to three literals and draw the logic diagram: (x'y'+z)'+z+xy+wz.	6M	CO1	L2
		OR			
3.	a)	A 12 bit Hamming code word containing 8 bits of data and 4 parity bits is read from memory. What was the original 8 bit data word that was written into memory if the 12 bit word read out is as 101110010100?	6M	CO1	L3
	b)	Write a brief note on Gray codes. Also discuss methods for conversion from gray to binary code and vice versa.	6M	CO1	L2
		UNIT–II			
4.	a)	Rewrite the following Boolean expression in the minterm and maxterm canonical and Standard forms. f(x,y,z) = x'(y'+z)+z'	6M	CO2	L2
	b)	Using K-map find the minimized Boolean function and its complement for the following f(A,B,C,D) = ∑m(1,2,3,4,6,8,9,10,11,12,14).	6M	CO2	L3
		OR			
5.	a)	Simplify the following Boolean function using tabular method: f(A, B, C, D)=Σm(0, 6, 8, 13, 14)+ Σd (2, 4,10) and identify essential prime implicants.	6M	CO2	L3
	b)	A truth table has four inputs variables. The first eight outputs are 0's and the last eight output are 1's. Draw the k-Map and write down the simplified expression	6M	CO2	L3

UNIT–III

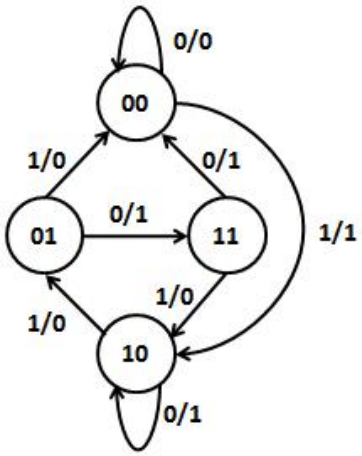
6.	a)	Realize the following Boolean function with multiplexer f(A,B,C,D) = m(0,1,3,4,8,9,15). i) Using 8:1 MUX with A,B,C select lines ii) Using 4:1 MUX with A,B select lines	6M	CO3	L3
	b)	Design a digital system to add two Binary Coded Decimal numbers using binary adder.	6M	CO3	L3
		OR		CO3	
7.	a)	Implement 4*16 decoder using two 3*8 decoders.	6M	CO3	L3
	b)	Give circuit implementation of 4 Bit Ripple Adder/Subtractor using twos complement method.	6M	CO3	L2

UNIT–IV

8.	a)	With the help of logic diagram, explain working of Master slave JK Flip-Flop along with waveforms. Explain race around condition. How is it eliminated?	6M	CO3	L2
	b)	Convert JK Flip-Flop to SR Flip-Flop.	6M	CO3	L2
		OR			
9.	a)	Design a D type positive edge triggered flip-flop. Explain the operation of the sequential circuit when CP = 1.	6M	CO3	L3
	b)	Design a 4-bit Johnson counter and explain.	6M	CO3	L3

UNIT–V

10. Construct a sequential logic circuit with single input and single output by obtaining the state and excitation table for the given state diagram using JK FF.



12M CO4 L3

OR

11. Construct Moore and Mealy state diagram that will detect input sequence 10110, when input pattern is detected, z is asserted high. Give state diagram for each state. 12M CO4 L3

*** End ***

Hall Ticket Number :										

R-20

Code: 20AC36T

II B.Tech. I Semester Supplementary Examinations July 2023

Managerial Economics and Financial Analysis

(Common to CE & 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 marks.**

3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

		CO	BL
1.	Answer ***all*** the following short answer questions (5 X 2 = 10M)		
a)	State the law of demand.	CO1	L2
b)	Write a short note on Isoquants.	CO2	L1
c)	What is joint Hindu family business?	CO3	L1
d)	List the methods of capital budgeting.	CO4	L3
e)	Differentiate tangible assets from intangible assets.	CO5	L1

PART-B

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

		Marks	CO	BL
	UNIT–I			
2.	Explain the reasons why demand curve always slopes downwards.	12M	CO1	L2
	OR			
3.	What are the various forecasting techniques? Explain each of them in detail.	12M	CO1	L2
	UNIT–II			
4.	Explain the behavior of Total Cost (TC), Total Variable Cost (TVC) and Total Fixed Cost using suitable cost-output diagram.	12M	CO2	L4
	OR			
5.	From the following information calculate the breakeven point and the turnover required to earn a profit of Rs.36,000.Given that Fixed overheads-Rs.1,80,000 Variable cost per unit-Rs.2/ and Selling price-Rs.20/. If the company is earning a profit of Rs.36, 000, find the margin of safety available to it.	12M	CO2	L1
	UNIT–III			
6.	Explain the price output decision under monopolistic competition in the long run with the help of diagram.	12M	CO3	L1

OR

7. Summarize the differences between private company and public company. 12M CO3 L1

UNIT–IV

8. Discuss the different sources of raising capital, for an organization. 12M CO4 L1

OR

9. Compute the NPV for the projects X and Y and choose the best. The firm's cost of capital is 10%. 12M CO4 L4

Year	Project X	Project Y
0	70,000	70,000
1	10,000	50,000
2	20,000	40,000
3	30,000	20,000
4	45,000	10,000
5	60,000	10,000

UNIT–V

10. a) Discuss the importance of financial statement analysis in business. 6M CO5 L3

    b) Summarize the managerial applications of ratio analysis. 6M CO5 L3

OR

11. Journalize the following entries in the Books of M/s. Rock Well Industries Ltd. 12M CO5 L3

No	Date	Description	Rs. Lakhs
1	01-05-2020	Started Business with cash	5.00
2	02-05-2020	Deposited in Andhra Bank	3.00
3	05-05-2020	Purchased Goods on Credit from ABC Ltd	15.00
4	08-05-2020	Sold goods on Credit to XYZ Ltd	5.00
5	10-05-2020	Paid Freight Charges by Cheque	0.25
6	25-05-2020	Paid Salaries from Bank	2.00
7	30-05-2020	Drawn Cash from Bank	5.00
8	31-05-2020	Purchased Furniture on Credit from GBL	1.20

*** End ***.

Hall Ticket Number :										

R-20

Code: 20A431T

II B.Tech. I Semester Supplementary Examinations July 2023

Signals & 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 marks.**
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 BL

a) Sketch the following signal: $y(t) = r(t) - r(t-2) - 5r(t-3) + 5r(t-4)$ CO1 L1

b) Determine the Fourier transform of Signum function. C02 L2

c) Determine the Nyquist sampling rate and Nyquist sampling interval for the signal: $x(t) = \text{sinc}(100\pi t) + 5\,\text{sinc}^2(200\pi t)$ CO3 L2

d) Compare ESD and PSD. CO4 L2

e) State the properties of ROCs of X(z). CO5 L2

PART-B

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

Marks CO BL

UNIT–I

2. a) Determine whether the following system is Linear or non-linear $\frac{d^3y(t)}{dt^3} + 5\frac{d^2y(t)}{dt^2} + 6\frac{dy(t)}{dt} + 2y(t) = x^2(t)$ 6M CO1 L2

b) Obtain the exponential Fourier series for the function $x(t) = A\sin(\omega t)$ over the interval $0 \le t \le \pi$. 6M CO1 L2

OR

3. a) Derive the expressions for the trigonometric Fourier series coefficients. 6M CO1 L2

b) Find the trigonometric Fourier series of $x(t) = t^2$ over the interval (-1,1). 6M CO1 L3

UNIT–II

4. a) Compute the Fourier transform of the following signals
i) $e^{-at}u(t)$ ii) Triangular pulse 6M CO2 L4

b) For a signal x(t), the FT is X(f). Determine the Inverse FT of X(3f+2). 6M CO2 L2

OR

5. a) State and prove the following properties of Fourier series.
(i). time shifting (ii). convolution — 6M CO2 L2

b) What is Hilbert transform? How does it differ from other transforms? — 6M CO2 L1

UNIT–III

6. a) State and prove the properties of LTI Systems — 6M CO3 L2

b) Obtain the conditions for the Distortionless transmission through a system. — 6M CO3 L2

OR

7. a) State and prove sampling theorem for low pass signals. — 8M CO3 L2

b) The spectral range of a signal extends from 5.6 MHz to 6.8 MHz. Find the minimum sampling rate and maximum sampling time. — 4M CO3 L2

UNIT–IV

8. a) For a system ... impulse response is $h(t) = e^{-2t}u(t) + e^{}u(-t)$. Find the output for the system. — 6M CO4 L2

b) Show that the convolution of two odd functions is an even function. — 6M CO4 L2

OR

9. a) Show that auto correlation function and ESD form a Fourier transform pair. — 6M CO4 L2

b) Find the autocorrelation and ESD of signal $x(t) = e^{-t}u(t)$ using the relation between convolution and correlation. — 6M CO4 L2

UNIT–V

10. a) State and prove any two properties of Laplace transforms. — 6M CO5 L2

b) If $X(s) = \frac{s+2}{s^2+8s+25}$, find x(t), t ≥ 0. — 6M CO5 L2

OR

11. a) Prove that the sequence $x(n)=a^n u(n)$ and $x(n)=-a^n u(-n-1)$ have the same X(z) and differ only in ROC. — 6M CO5 L3

b) Find the Inverse Z-transform of the sequence
$X(Z) = \frac{z}{2z^2-3z+1}$, ROC: |z|>1 — 6M CO5 L2

*** End ***

Hall Ticket Number :										

R-20

Code: 20AC32T

II B.Tech. I Semester Supplementary Examinations July 2023

Transform Techniques & Complex Variables

(Common to EEE and 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 marks.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

		CO	BL
1.	Answer *all* the following short answer questions (5 X 2 = 10M)		
a)	Answer *all* t t step function and write Laplace transform of unit step function What is uni $u(t-a)$ State conv	2	2
b)	State convolution theorem.	2	1
c)	Define half- range sine series, half-range cosine series.	2	1
d)	Find real and imaginary parts of $e^{f(z^2)}$.	2	2
e)	Find the poles and order of poles of f(z)= $\frac{z}{2z^2+1}$	2	2

PART-B

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

		Marks	CO	BL
	UNIT–I			
2. a)	Find $L(\int_0^t \frac{e^t \sin t}{t} dt)$	6M	1	2
b)	Apply Laplace transform and evaluate $\int_0^\infty \frac{\sin 2t}{t} dt$	6M	1	3
	OR			
3. a)	Find Laplace transform of nd evaluate $\int_0^\infty \frac{\sin 2t}{t} dt$ OR $\cos t \cos 2t \cos 3t$.	6M	1	2
b)	Fi nd La p lace transform of OR $\cos t \cos 2t$ d hence find transform of $\sin\sqrt{t}$ anc $\frac{\cos\sqrt{t}}{\sqrt{t}}$	6M	1	3
	UNIT–II			
4. a)	Find inverse Laplace transform of $\frac{1}{\sqrt{2s-3}}$	6M	2	2
b)	Apply convolution and find N rm c $\frac{1}{\sqrt{2s-3}}$ $L^{-1}[\frac{1}{(s^2+a^2)(s^2+b^2)}]$.	6M	2	3
	OR			
5. a)	Find $L^{-1}[\frac{2s-5}{s^2-4}]$	6M	2	2
b)	Solve $L^{-1}[\frac{2s-5}{s^2-4}]$ $x'' + 2x' + x = 3te^{-t}$ given $x(0) = 4, x'(0) =$ 0	6M	2	3

UNIT–III

6. a) Find Fourier series of the function $f(x) = e^{-x}$ in $(0, 2\pi)$. 6M 3 3

   b) Using Fourier sine integral show that

$$\int_0^\infty \frac{a \sin a x}{(a^2 + a^2)(a^2 + b^2)} da = \frac{\pi}{2(b^2 - a^2)}(e^{-ax} - e^{-bx}),$$

   $a,b > 0$ 6M 3 3

OR

7. a) Find the Fourier Sine transform and Fourier Cosine transform of $f(x) = 2e^{-5x} + 5e^{-2x}$. 6M 3 3

   b) Find the half range cosine series of $f(x) = (x-1)^2$ in the interval $0 < x < \pi$ and show that $\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \cdots = \frac{\pi^2}{8}$. 6M 3 3

UNIT–IV

8. a) Show that the function $f(z) = \frac{(xy)^n}{\sqrt{|xy|}}$ is not analytic at the origin although Cauchy-Riemann equations are satisfied at that point. 6M 4 3

   b) Evaluate $\int_c (z^2 + y^2)dx + (z^2 + x^2)dy + (x^2 + y^2)dz$ from (0, 0, 0) to (1, 1, 1) where c is the curve $x=t, y=t^2, z=t^3$ in the parametric form. 6M 4 3

OR

9. a) Find the analytic function $f(z) = u+iv$ if $u-v = e^x(\cos y - \sin y)$ 6M 4 3

   b) Evaluate $\int_c \frac{z^3 e^{-z}}{(z-1)^3} dz$ where c is $|z-1| = \frac{1}{2}$ using Cauchy's integral formula 6M 4 3

UNIT–V

10. a) Find the Taylor's series expansion of $f(z) = \frac{1}{z^2+z-6}$ in the region $|z| < 1$ 6M 5 3

    b) Apply Cauchy's residue theorem, evaluate $\int_c \frac{z-3}{z^2+2z+5} dz$ where c is the circle $|z+1+i| = 2$. 6M 5 3

OR

11. a) Expand $f(z) = \frac{z+3}{z(z^2-z-2)}$ in power series of z where $1 < |z| < 2$ 6M 5 3

    b) Find the residues of $f(z) = \frac{\sin \pi z^2 + \cos \pi z^2}{(z-1)^2(z-2)}$ and evaluate $\int_c f(z)dz$ where c is $|z| = 3$. 6M 5 3

*** End ***

Hall Ticket Number :										

R-20

Code: 20A433T

II B.Tech. I Semester Supplementary Examinations July 2023

Analog Circuits

(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 marks.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

		CO	BL
1.	Answer ***all*** the following short answer questions (5 X 2 = 10M)		
a)	State Miller's theorem.	1	1
b)	List the advantages of negative feedback.	2	1
c)	What are the primary requirements to obtain steady oscillation at a fixed frequency?	3	5
d)	What is the maximum efficiency of class B amplifier?	4	4
e)	Draw a Transistor clipper circuit.	5	2

PART-B

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

		Marks	CO	BL
	UNIT–I			
2. a)	Illustrate the h-parameter model of a BJT-CE amplifier and derive the equations for voltage gain, current gain, input impedance and output impedance.	6M	1	2
b)	The hybrid parameters of a transistor used as an amplifier in the CE configuration are h_{ie} = 800Ω, h_{fe}=46, h_{oe}=80 × 10-6 and h_{re}=5.4× 10^{-4}. If R_L=5kΩ and R_s =500Ω. Find A_i, R_i, A_v, R_o.	6M	1	4
	OR			
3. a)	i. Given β=120, r_e=4.5Ω, and r_o=40kΩ, sketch the approximate hybrid equivalent circuit.			
	ii. Given h_{ie}=1kΩ, h_{re}=2×10^{-4}, h_{fe}=90, and hoe 20=μS, sketch the re model.	8M	1	5
b)	Explain dual of miller's theorem	4M	1	1
	UNIT–II			
4. a)	If an amplifier with gain of -1000 and feedback of β=-0.1 has a gain change of 20% due to temperature, calculate the change in gain of the feedback amplifier.	6M	2	3
b)	List the general characteristics of negative feedback amplifiers.	6M	2	1
	OR			

5.	a)	Discuss in detail about voltage-series feedback and voltage-shunt feedback amplifier.	6M	2	2
	b)	Calculate the gain, input, and output impedances of a voltage-series feedback amplifier having A=-300, R_i =1.5 kΩ, , R_o= 50 kΩ , and β=-1/15.	6M	2	3

UNIT–III

6.	a)	Design a passive RC phase shift network to achieve a phase shift of 60^o.	6M	3	5
	b)	An amplifier bursts into oscillation when the loop gain Aβ=1, but for sustained oscillation Aβ>1. Why so?	6M	3	3

OR

7.	a)	Explain the principle of operation of crystal oscillator. Draw the frequency response of crystal oscillator.	6M	3	4
	b)	A 1 mH inductor is available. Choose the capacitor values in a Colpitts oscillator so that f = 1 MHz and β = 0.25.	6M	3	3

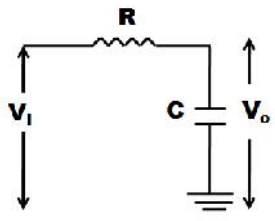
UNIT–IV

8.	a)	For a class B amplifier providing a 20 V peak signal to a 16Ω load (speaker) and a power supply of V_{CC} 30 V, determine the input power, output power, and circuit efficiency.	6M	4	5
	b)	With suitable circuit diagram explain a class A amplifier.	6M	4	2

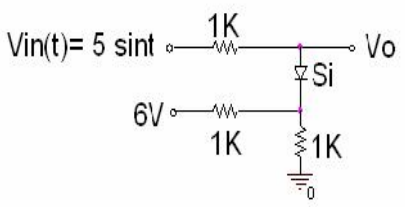
OR

9.	a)	With suitable circuit diagram explain a push-pull amplifier.	6M	4	1
	b)	Explain power dissipation in transistor amplifier. Suggest the methods to address this issue.	6M	4	5

UNIT–V

10.	a)	Find out the impulse response of a single stage low pass filter.	6M	5	4
	b)	Compute the time domain output of this circuit of a power of 1volt is given as its input. 	6M	5	5

OR

11.	a)	Determine the output for the following circuits 	6M	5	3
	b)	State and prove clamping circuit theorem.	6M	5	4

*** End ***