Hall Ticket Number :										

R-20

Code: 20AC32T

II B.Tech. I Semester Regular Examinations March 2022

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 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) Find $L[\sin 3t \cos 2t]$ — CO1 — L4

b) Evaluate: $L^{-1}\left[\frac{1}{s(s+2)}\right]$ — CO2 — L3

c) Find the Fourier coefficient a_n of the Fourier series expansion for the function $f(x) = x^2$ in the interval $[0, 2\pi]$. — CO3 — L1

d) Evaluate $\int_C \frac{1}{z} dz$, where C the circle is $x = \cos t, y = \sin t,$ $0 \le t \le 2\pi$. — CO4 — L2

e) Find the poles and residues of the function $\frac{z^2}{(z-1)(z-2)^2}$. — 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) Find the Laplace Transformation of $f(t) = \frac{e^{-at} - e^{-bt}}{t}$. — 6M — CO1 — L3

b) Show that $\int_0^\infty e^{-3t} t \sin t \, dt = \frac{3}{50}$. — 6M — CO1 — L3

OR

3. a) Find the Laplace Transform of $f(t) = t^2, 0 < t < 2$ where $f(t+2) = f(t)$. — 6M — CO1 — L1

b) Find the Laplace Transformation of $f(t) = t \sin^3 t$. — 6M — CO1 — L1

UNIT–II

4. a) Find the inverse Laplace Transformation of

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

12M CO2 L3

OR

5. Solve the differential equation

$$\frac{d^2y}{dt^2}-2\frac{dy}{dt}+y=e^t;\ y(0)=2;\ y'(0)=-1$$

by using Laplace Transformation. 12M CO2 L3

UNIT–III

6. Find Fourier Cosine and Sine series for the function $f(x)=x-x^2$ in $0<x<1$. 12M CO3 L4

OR

7. a) Find Fourier transform of $f(x)=\begin{cases}1+\frac{x}{a} & -a<x<0\\ 1-\frac{x}{a} & 0<x<a\\ 0 & otherwise\end{cases}$. 6M CO3 L1

b) Find the Fourier sine transform of $f(x)=e^{-ax}, a>0$. 6M CO3 L1

UNIT–IV

8. Show that the function $u=e^{-2xy}\sin(x^2-y^2)$ is harmonic. Find the conjugate function v and express $u+iv$ as an analytic function of z. 12M CO4 L2

OR

9. Evaluate $\int_C \frac{1}{z^2+9}dz$ where C is

(i) $|z-3i|=4$ (ii) $|z+3i|=2$ (iii) $|z|=5$. 12M CO4 L2

UNIT–V

10. a) Expand $f(z)=\dfrac{z}{(z+1)(z+2)}$ in Taylor series about $z=2$. 6M CO5 L2

    b) State Cauchy Residue theorem and hence evaluate $\int_C \dfrac{\sin\pi z^2+\cos\pi z^2}{(z-1)^2(z-2)}dz$ where the contour C is $|z|=3$. 6M CO5 L2

OR

11. a) Expand $f(z)=\dfrac{8z+1}{z(1-z)}$ in a Laurent series valid for $0<|z|<1$. 6M CO5 L3

    b) State Cauchy Residue theorem and hence evaluate $\int_C \dfrac{1}{(z-1)(z+2)^2}dz$ where the contour C is

    (i) $|z|=\dfrac{3}{2}$ (ii) $|z|=3$. 6M CO5 L3

*** End ***

Hall Ticket Number :										

R-20

Code: 20A433T

II B.Tech. I Semester Regular Examinations March 2022

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 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) List the benefits of hybrid parameters.	CO1	L1
b) Define the feedback amplifier.	CO2	L1
c) What are conditions for Barkhausen criterion?	CO3	L1
d) What are the applications of power amplifiers?	CO4	L1
e) Draw the high pass RC circuit.	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 small signal model of CE Amplifier and derive the expression for its AV, AI, Ri, RO.	6M	CO1	L3
b) Explain about Millers theorem and its dual.	6M	CO1	L2
OR			
3. a) Derive the expressions for current gain, voltage gain, input impedance and output impedance of CE amplifier using simplified hybrid model.	6M	CO1	L3
b) Discuss various methods used for coupling used in amplifiers with neat circuit diagrams.	6M	CO1	L2
UNIT–II			
4. a) Explain Feedback amplifier topologies with necessary diagram.	8M	CO2	L2
b) List the characteristics of negative feedback amplifiers.	4M	CO2	L1
OR			

5.	a)	Explain about concept of feedback.	6M	CO2	L2
	b)	Derive the expressions of Gain, input and output resistances for a Voltage Series feedback amplifier.	6M	CO2	L3

UNIT–III

6.	a)	Construct RC phase shift oscillator using BJT and derive its expression for frequency of oscillations.	8M	CO3	L3
	b)	In a Wein-bridge oscillator, if the value of R is 100KΩ, and frequency of oscillation is 10 KHz, Calculate the value of capacitor C.	4M	CO3	L3

OR

7.	a)	Explain working of colpitts oscillator and derive the expression for frequency of oscillations.	8M	CO3	L2
	b)	In the Colpitts oscillator, C1=0.2μF and C2=0.02μF. If the frequency of oscillations 10kHz, Calculate the value of inductor.	4M	CO3	L3

UNIT–IV

8.	a)	Classify the different types of power amplifiers and explain them briefly.	4M	CO4	L2
	b)	With neat diagram, explain Series fed directly coupled Class A Power Amplifier and determine its maximum efficiency.	8M	CO4	L3

OR

9.	a)	Discuss about Transformer coupled Class A Power Amplifier with diagram and determine its Maximum efficiency.	6M	CO4	L3
	b)	Explain the working principle of class B push pull amplifier.	6M	CO4	L2

UNIT–V

10.	a)	Draw the low pass RC circuit and derive response of it when it is applied with step input.	8M	CO5	L3
	b)	Prove high pass RC circuit act as differentiator.	4M	CO5	L3

OR

11.	a)	State and prove clamping circuit theorem.	6M	CO5	L3
	b)	Draw positive and negative clamper circuits and explain.	6M	CO5	L2

*** End ***

Hall Ticket Number :										

R-20

Code: 20A432T

II B.Tech. I Semester Regular Examinations March 2022

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 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) Determine the value of x if $(193)x=(623)_8$	CO1	L2
b) What is a K-Map?	CO2	L5
c) Draw the Full Adder logic diagram.	CO3	L6
d) Differentiate between Combinational & Sequential Circuit.	CO3	L6
e) List the Limitations of Finite State Machine.	CO4	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)	Convert the $(101101.1101)_2$ number into Decimal, Hexadecimal and octal form.	6M	CO1	L2
b)	State De Morgan's Theorems? Explain with example and logic.	6M	CO2	L3
OR				
3. a)	Explain about classification of any four binary codes.	6M	CO1	L2
b)	The Hamming code 101101101 is received correct it if any errors- four parity bits and odd parity is used.	6M	CO1	L2
UNIT–II				
4. a)	Simplify the following Boolean function for minimal SOP form using k –Map method. F(A,B,C,D)=∑m(0,1,2,3,5,7,8,9,11,14)	8M	CO2	L5
b)	Prove the identity of the following equation. **a'b+(bc)'+ab+b'c=1**	4M	CO2	L5
OR				
5. a)	Find the duality and complement for the following function F=ABC+A'B'C'+AB'C'+A'BC+AB'C+ABC'	7M	CO2	L5

	b)	Express the following function in to SSOP form. F(X,Y,Z)=XZ'+X'Y+Y'Z	5M	CO2	L5

UNIT–III

6.	a)	Explain about 4 Bit Binary Adder with suitable diagram.	6M	CO3	L6
	b)	Implement the function F (A, B, C) =∑m (1, 3, 5, 6) using 2:1 MUX.	6M	CO3	L6

OR

7.	a)	Design 3 to 8 Decoder using basic gates.	8M	CO3	L6
	b)	Differentiate between MUX and DEMUX	4M	CO3	L6

UNIT–IV

8.	a)	Summarize the SR, JK, D & T flip-flops with characteristic table.	8M	CO3	L2
	b)	Implement Master Slave JK flip flop using NAND Gates.	4M	CO3	L6

OR

9.	a)	List the steps in synchronous sequential circuit design	6M	CO3	L6
	b)	What is race around condition in JK flip flop and how it is eliminated?	6M	CO3	L6

UNIT–V

10.	a)	Explain State Diagram and State Table with an example?	8M	CO4	L2
	b)	Compare Mealy and Moore Machines.	4M	CO4	L2

OR

11.	a)	Describe the features of ASM chart.	6M	CO4	L2
	b)	Specify the Capabilities of Finite State Machine.	6M	CO4	L2

*** End ***

Hall Ticket Number :										

R-20

Code: 20AC36T

II B.Tech. I Semester Regular Examinations March 2022

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 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)	Scope of managerial economics		CO2	L1
b)	Internal and external economies of scale		CO1	L1
c)	Characteristics of perfect competition.		CO2	L2
d)	Significance of capital		CO3	L3
e)	Purpose of ratio analysis		CO3	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)	Illustrate the measurement of elasticity of demand.	7M	CO3	L1
	b)	Explain the significance of elasticity of demand.	5M	CO2	L1
		OR			
3.		Define demand forecasting. Explain the quantitative methods of demand forecasting.	12M	CO3	L1
		UNIT–II			
4.	a)	State the objectives of break-even analysis.	6M	CO1	L2
	b)	Highlight the assumptions of break-even analysis.	6M	CO3	L2
		OR			
5.	a)	Define cost. Explain different cost concepts used in the process of cost analysis.	6M	CO3	L2
	b)	Discuss the properties of Cobb-Douglas production function.	6M	CO2	L2
		UNIT–III			
6.	a)	State the features of monopoly.	4M	CO1	L2
	b)	Analyse the firm's revenue curves under monopoly.	8M	CO3	L2

OR

7.		Discuss about various forms of private sector business organizations.	12M	CO2	L2

UNIT–IV

8.	a)	Explain the advantages and limitations of Net Present Value (NPV) technique in capital budgeting.	8M	CO2	L3
	b)	A project will cost '200,000 and will generate annual cash flows of '70,000. What is the project's payback period	4M	CO2	L3

OR

9.		Illustrate the procedure of calculating accounting rate of return (ARR). Discuss its limitations.	12M	CO3	L3

UNIT–V

10.	a)	Define trial balance. Explain the objectives in preparing it.	5M	CO3	L3
	b)	Prepare a trial balance for the month ending 31st August 2021:			

Cash a/c	50,500
Madhu capital a/c	30,000
Interest from bank	3,000
Discount (credit)	250
Sales	35,000
David a/c	3,000
Purchase returns a/c	500
Bank a/c	10,500
Rent a/c	2,500
Salaries a/c	500
Entertainment expenses	150
Purchase a/c	2,000
Sales returns a/c	300

7M CO3 L4

OR

11.	a)	Define 'ratio'. Discuss the importance of ratio analysis.	6M	CO2	L3
	b)	Classify the ratios and explain uses of each group.	6M	CO2	L3

*** End ***

Hall Ticket Number :										

R-20

Code: 20A431T

II B.Tech. I Semester Regular Examinations March 2022

Signals and 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**

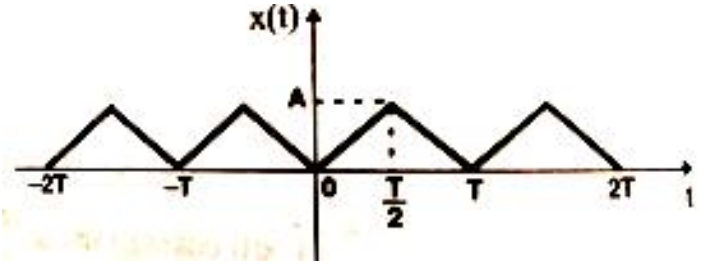
PART-A

(Compulsory question)

		CO	Blooms Level
1.	Answer ***all*** the following short answer questions (5 X 2 = 10M)		
a)	Define causal and non-causal signal. Give one example for each.	CO1	L1
b)	State and prove time shifting property of Fourier transform	CO2	L2
c)	State sampling theorem	CO3	L2
d)	Write any two properties of convolution.	CO4	L3
e)	Find the Z-transform and its ROC of δ (n + k).	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)	Write short notes on the following signals: (i) Unit step (ii) Unit impulse (iii) Unit ramp (iv) Signum function	6M	CO1	L1
b)	What are the basic operations of signals? Illustrate any three operations with one example for each operation.	6M	CO1	L1
	OR			
3. a)	State and prove any two Fourier series properties	6M	CO1	L1
b)	Find the trigonometric form of Fouries series of the waveform shown in Fig . 	6M	CO1	L1
	UNIT–II			
4. a)	Find the Fourier Transform of following signals i) e^{3t} u(t) (ii) cos ω_ot u(t)	6M	CO2	L5

	b)	State and prove any three Fourier transform properties.	6M	CO2	L2
		OR			
5.	a)	Find the Fourier transform of the following signal $x(t) = e^{-\|t\|}$ for $-2 \le t \le 2$ $= 0$ otherwise	6M	CO2	L5
	b)	State and discuss about Hilbert transform.	6M	CO2	L2
		UNIT–III			
6.	a)	What is an LTI system? Explain its properties. Derive an expression for the Transfer function of an LTI system.	6M	CO3	L2
	b)	Obtain the conditions for the distortion less transmission through a system	6M	CO3	L2
		OR			
7.	a)	With the help of graphical example explain sampling theorem for band limited signals.	6M	CO3	L2
	b)	Determine the Nyquist sampling rate and Nyquist sampling interval for i) $x(t) = 2 \text{ sinc } (100 \pi t)$ ii) $x(t) = \text{sinc } (80 \pi t) \text{ sinc } (120 \pi t)$	6M	CO3	L2
		UNIT–IV			
8.		Perform the convolution of the following signals by graphical method. $x_1(t) = e^{-3t}\, u(t)$; $h(t) = u(t+3)$	12M	CO4	L3
		OR			
9.	a)	State and prove properties of correlation.	6M	CO4	L3
	b)	Define and prove Parseval's energy theorem.	6M	CO4	L3
		UNIT–V			
10.	a)	The unilateral Laplace transform of f (t) is $\frac{1}{s^2+s+1}$ What is the unilateral Laplacetransform of t f (t).	6M	CO5	L5
	b)	Find the inverse Laplace transform of $x(s) = 5(s+5) / [s(s+3)(s+7)]$; $Re(s) > -3$	6M	CO5	L5
		OR			
11.	a)	State and prove frequency shifting and time convolution properties of z-transform.	6M	CO5	L5
	b)	Find the inverse Z-transform of $X(z) = \frac{z+2}{4z^2 - 2z + 3}$	6M	CO5	L5

*** End ***