Hall Ticket Number :										

R-19

Code: 19AC31T

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

Partial Differential Equations and Complex Variables

(Common to All Branches)

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)	Find the Laplace Transform of $e^{2t}+4t^3-2\sin 3t+3\cos 3t$	7M	CO1	L1
	b)	Find the L.T of $\left(t^2+1\right)^2$	7M	CO1	L1
		OR			
2.		Find $L\left\{e^{-3t}\int_0^t \frac{\sin t}{t}dt\right\}$	14M	CO1	L1
		UNIT–II			
3.		Find inverse L.T of $\frac{5s-2}{s^2(s+2)(s-1)}$	14M	CO2	L1
		OR			
4.		Using convolution theorem , find $L^{-1}\left\{\frac{1}{(s+a)(s+b)}\right\}$	14M	CO2	L3
		UNIT–III			
5.		Obtain the Fourier series for $f(x)=x-x^2$ in the interval $[-®,®]$. Hence Show that $\frac{1}{1^2}-\frac{1}{2^2}+\frac{1}{3^2}-\frac{1}{4^2}+\ldots\ldots\ldots\ldots=\frac{®^2}{12}$	14M	CO3	L3
		OR			
6.		Find the half range sine series for $f(x)=x(®-x)$ in $0<x<®$ deduce that $\frac{1}{1^3}-\frac{1}{3^3}+\frac{1}{5^3}-\frac{1}{7^3}+\ldots\ldots\ldots\ldots=\frac{®^2}{32}$	14M	CO3	L1
		UNIT–IV			
7.		Use separation of variables to solve $\frac{\partial^2 u}{\partial x^2}=\frac{\partial u}{\partial y}+2u$ in the form $u=f(x)g(y)$. Obtain the solution satisfying $u=0$, $\frac{\partial u}{\partial x}=1+e^{-3y}$ when $x=0$ for all values of y.	14M	CO4	L3
		OR			
8.		A homogeneous rod of conducting material of length 100 cm has its ends kept at zero temperature and the temperature initially is $u(x,0)=\begin{cases}x & ;0\le x\le 50\\ (100-x) & ;50\le x\le 100\end{cases}$ Find the temperature $u(x,t)$ at any time.	14M	CO4	L3
		UNIT–V			
9.		Find the conjugate harmonic function of the harmonic function $u=x^2-y^2$	14M	CO5	L1
		OR			
10.		Evaluate $\int_c \frac{e^{2z}}{(z-1)(z-2)}dz$ *where* $c:\lvert z\rvert=3$.	14M	CO5	L5

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Hall Ticket Number :										

R-19

Code: 19A432T

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

Random Variables Theory

(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)	Define and explain the Joint and conditional probability.	7M	CO1	L2
	b)	A lot of 100 semiconductor chips contain 20 that are defective. Two chips are selected at random, without replacement, from the lot. i. What is the probability that the second one selected is defective given that the first one was defective. ii. What is the probability that both are defective?	7M	CO1	L3
		OR			
2.	a)	Explain the concept of Baye's Theorem.	7M	CO1	L2
	b)	A diagnostic test has 99% accuracy and 60% of all people have Covid-19. If a patient tests positive, what is the probability that they actually have the disease?	7M	CO1	L3
		UNIT–II			
3.	a)	Define a random variable and list the conditions of a variable satisfied to become a random variable.	4M	CO2	L2
	b)	Define probability distribution function. List & prove their properties.	10M	CO2	L2
		OR			
4.	a)	Define and formulate the Poisson distribution and density function.	6M	CO2	L2
	b)	Assume automobile arrivals at a gasoline station are Poisson and occur an average rate of 50 / hour. The station has only one gasoline pump. If all cars are assumed to require one minute to obtain fuel. What is the probability that a waiting line will occur at the pump?	8M	CO2	L3
		UNIT–III			
5.	a)	Define an expected value of a random variable X.	4M	CO3	L2
	b)	What is the expected value of an exponential random variable X?	10M	CO3	L3
		OR			
6.	a)	State and Prove the Chebyshev's inequality.	7M	CO3	L3
	b)	Discuss the concept of functions that give moments.	7M	CO3	L2
		UNIT–IV			
7.		Define Joint probability distribution function and Explain the properties of joint distribution function.	14M	CO3	L2
		OR			
8.	a)	Explain about the jointly Gaussian random variables.	7M	CO3	L2
	b)	Explain about the joint characteristic function.	7M	CO3	L2
		UNIT–V			
9.		Define stationary. Explain the first order, second order and wide sense stationary.	14M	CO5	L2
		OR			
10.		List and prove all the properties of cross-correlation function	14M	CO5	L2

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Hall Ticket Number :										

R-19

Code: 19A434T

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

Signals and Systems

(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

UNIT–I

1. a) Explain the various operations on signals 7M

   b) Determine whether the following signals are periodic or not? If periodic determine fundamental period.

   i) $\cos t + \sin \sqrt{2}t$ Cost ii) $2\cos 100®t + 5\sin 50t$ 7M

OR

2. a) State and prove convolution property in Fourier series. 7M

   b) Find the exponential Fourier series and plot the magnitude and phase spectrum of half wave rectified sine wave with amplitude A and T =2π 7M

UNIT–II

3. a) Find the Fourier transform of DC Signal 7M

   b) Find the Fourier transform of x(t) = u(2t), where u(t) is the unit step function 7M

OR

4. a) State and prove Differentiation and integration properties of Fourier Transform. 7M

   b) Obtain the Fourier transform of Signum function and sketch its phase spectrum. 7M

UNIT–III

5. a) Differentiate LTI system with LTV system. 7M

   b) Find the impulse response of series RC limit. Explain the difference between causal and non-causal systems. 7M

OR

6. a) Discuss about the Causality and physical reliability of a system. 7M

   b) The output response of a continuous time LTI system is $2e^{-3t}u(t)$ when the input x(t) is u(t) find the Transfer function. 7M

UNIT–IV

7. a) State and prove Time convolution property 7M

   b) State and prove any four properties of Auto correlation function 7M

OR

8. a) With an example explain the Graphical representation of convolution. 7M

   b) Explain about the properties of LTI system 7M

UNIT–V

9. a) Explain the constraints on ROC for various classes of signals 7M

   b) State and prove the following properties of z-transform.

   i) Time shifting ii) Time reversal iii) Differentiation iv) Scaling in z-domain 7M

OR

10. Find the z-Transform of

    i) $X(z) = 1/(1-0.5z^{-1}+0.5-2)$ for ROC $Z > 1$ ii) $1/(z^2 -1.2z+0.2)$ 14M

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Hall Ticket Number :										

R-19

Code: 19A433T

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

Digital Design

(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

UNIT–I

1. a) Write a short note on error correcting and detecting codes 10M
   b) How many parity check bits are required for 64 bits of data word 4M

OR

2. a) Write a short note on logic gates and their truth tables 10M
   b) List out the properties of XOR gate 4M

UNIT–II

3. a) Realize XOR gate using NAND gates 7M
   b) Simplify the following expression using K-map. Y = AB'C+A'BC+A'B'C+A'B'C' 7M

OR

4. Obtain minimal expression using the K-map for a given Boolean function F(A,B,C,D,E) = Σ(0,2,8,10,12,13,14,22,23,25,29,30,31) and implement using NOR Gates 14M

UNIT–III

5. a) Design a circuit which convert given 4-bit gray code to binary code 7M
   b) Differences between PAL,PLA and ROM 7M

OR

6. a) Realize a circuit which generates the square of a 3-bit binary number by using PLA 10M
   b) Draw the architecture of ROM and PAL 4M

UNIT–IV

7. a) With a neat diagrams explain the operation of Ring counter 8M
   b) Draw the logic diagram of LATCH using NOR and NAND gates 6M

OR

8. Design MOD-12 synchronous counter using JK-FFs 14M

UNIT–V

9. a) compare Mealy and Moore machines 6M
   b) List out the salient features of the ASM chart 8M

OR

10. Convert given Mealy machine into Moore machine

PS	NS,Z	
	X=0	X=1
1	1,0	1,0
2	1,1	6,1
3	4,0	5,0
4	1,1	7,0
5	2,0	3,0
6	4,0	5,0
7	2,0	3,0

14M

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Hall Ticket Number :										

R-19

Code: 19A431T

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

Electronic Circuits

(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
		UNIT–I	
1.	a)	Derive the expressions of Millers theorem and its dual.	7M
	b)	Compare the input impedance, output impedance and voltage gain of CE, CB and CC configurations. Why CE amplifiers are widely used?	7M
		OR	
2.		A transistor in CB configuration is driven by a voltage source VS of internal resistance Rs = 800 Ω. The load impedance is resistor RL = 2000 Ω. The h- parameters are hib = 22 Ω, hrb = 3 x 10-4 , hfb = -0.98 and hob = 0.5 μA/V. Compute the current gain AI, input impedance Ri, voltage gain AV, overall voltage gain AVS, overall current gain AIS and output impedance Zo.	14M
		UNIT–II	
3.	a)	What is the significance of 3dB bandwidth?	7M
	b)	Explain the role of coupling capacitors and Bypass capacitors in a RC Coupled Amplifier Circuit.	7M
		OR	
4.	a)	Discuss about general frequency considerations.	8M
	b)	Derive the Expressions for Output conductance (gce), transconductance (gm) and feedback conductance (gb !c) of a CE amplifier at high frequencies in terms of its low frequency h-parameters	6M
		UNIT–III	
5.	a)	Explain the advantages of negative feedback over positive feedback.	7M
	b)	Briefly discuss about the effect of feedback on amplifier bandwidth	7M
		OR	
6.		An amplifier has voltage gain with feedback is 100. If the gain without feedback changes by 20% and the gain without feedback is 2%. Determine the open loop gain and the feedback ratio.	14M
		UNIT–IV	
7.	a)	List out the types of oscillators.	7M
	b)	With neat diagram explain about amplitude stability of oscillators.	7M
		OR	
8.	a)	With neat diagram explain about frequency stability of oscillators.	6M
	b)	A wein bridge oscillator has a frequency of 400Hz, if the value of C is 100pF then determine the value of R.	8M
		UNIT–V	
9.	a)	Explain crossover distortion in Class B power amplifier	7M
	b)	What is Q Factor? Write about unloaded and loaded Q in tuned circuit.	7M
		OR	
10.		A Class B Push-Pull amplifier supplies power to a loud speaker of 10Ω.The transformer has a turns ratio of N1:N2 of 4:1 and efficiency is 95%.calculate the following. (i) Max power output (ii) Max power dissipation in each transistor	14M

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Hall Ticket Number :										

R-19

Code: 19A237T

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

Electrical Circuits and Technology

(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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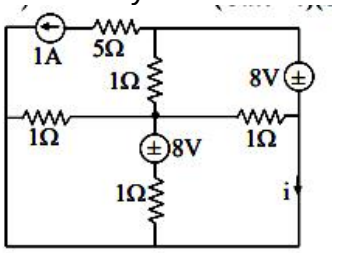
Marks

UNIT–I

1. Explain Transient Response of RL Series Circuits for DC Excitation using differential equation approach 14M

OR

2. Determine the Current i using Mesh analysis



14M

UNIT–II

3. a) What are the Advantages of AC Supply 6M
   b) Define Cycle, Time Period, Frequency & Amplitude 8M

OR

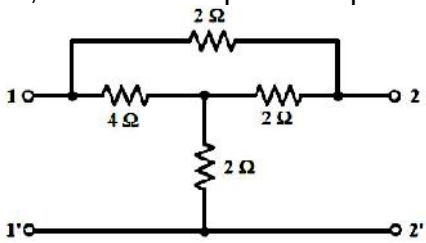
4. Explain the series resonant circuit. Derive the expression for the resonant frequency, Quality Factor of a series resonant circuit. 14M

UNIT–III

5. Explain with defining equations about (i) y-parameters; (ii) z-parameters; (iii) ABCD-parameters; (iv) h-parameters. 14M

OR

6. For the given 2-port network, determine impedance parameters



14M

UNIT–IV

7. a) Describe the principle of operation of a dc generator? 7M
   b) A 2 pole lap wound generator has 200 conductors on armature. It is driven by prime mover at a constant speed of 600 rpm. If the flux per pole is 0.1 Wb, calculate the generated emf. 7M

OR

8. How the efficiency of DC machine can be predetermined by using a swinburn's test with circuit diagram and give its advantages and disadvantages. 14M

UNIT–V

9. a) Write the principle of Induction motor. 4M
   b) Explain with the help of suitable diagram how the rotating magnetic field is produced in a three phase motor? 10M

OR

10. A 50 KVA, single phase transformer 2300/230 has primary and secondary winding resistances of 2 Ω and 0.02 Ω respectively. The iron losses are 412W. Calculate the efficiency at (i) Full – load (ii) Half – load When the power factor is 0.8 14M

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