Hall Ticket Number :										

R-19

Code: 19A237T

II B.Tech. I Semester Supplementary Examinations March/April 2023

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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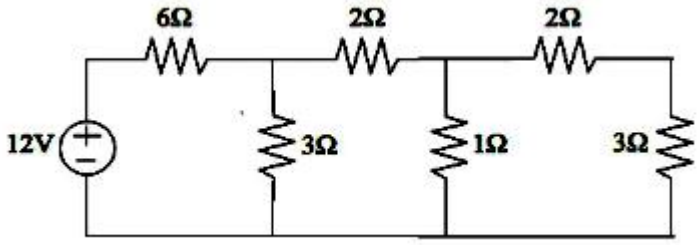
UNIT–I

1. Determine the loop currents using Mesh Analysis and also the branch voltages



OR

2. Explain source transformation and how can it be used to convert (i) a practical voltage source into a practical current source; (ii) a practical current source into a practical voltage source.

UNIT–II

3. Define Average & RMS Value, Form Factor, Peak Factor, Peak Value, Peak to Peak Value

OR

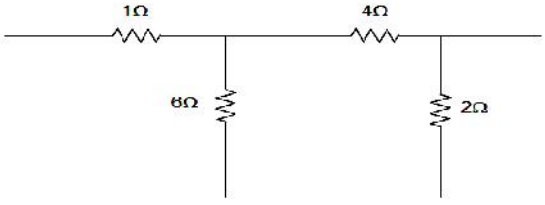
4. a) What are the Advantages of AC Supply
   b) Define Cycle, Time Period, Frequency & Amplitude

UNIT–III

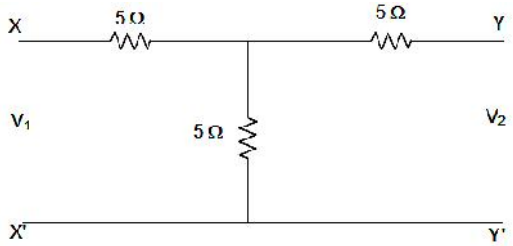
5. Explain with defining equations about i) y-parameters; ii) z-parameters; iii) ABCD-parameters; (iv) h-parameters.

OR

6. a) Determine h parameters for the two port network shown below



   b) Determine ABCD parameters for the two port network shown below



UNIT–IV

7. a) A long-shunt compound generator delivers a load current of 50 A at 500 V and has armature, series field and shunt field resistances of 0.05 Ω, 0.03 Ω and 250 Ω respectively. Calculate the generated voltage and the armature current. Allow 1V per brush for contact drop.

   b) List the types of characteristics in a dc generator?

OR

8. With the help of sketches describe the main parts of a dc machine? Explain the main function of each.

UNIT–V

9. a) Write the principle of Induction motor.

   b) Explain with the help of suitable diagram how the rotating magnetic field is produced in a three phase motor?

OR

10. a) Define practical transformer and explain the phasor diagram on NO-Load.

    b) The no load current of a transformer is 10A at a power factor of 0.25 lagging, when connected to 400V, 50Hz supply. Calculate, i) Magnetizing component of no load current ii) Iron loss iii) Maximum value of flux in the core

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Hall Ticket Number :										

R-19

Code: 19A431T

II B.Tech. I Semester Supplementary Examinations March/April 2023

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. Consider a single Stage CE Amplifier with Rs=1KΩ, R_1=50KΩ, R_2=2KΩ, Rc=2KΩ, hfe=50, hie=1.1KΩ, hoe=25μA/V and hre= 2.5X10-14.Find Ai!, Ri!, AV!, Ai=I_L/I_S, AVS=V_O/V_S. 14M

OR

2. a) Derive the expressions of Millers theorem and its dual. 7M
   b) Draw and explain the circuit of cascaded amplifier and mention the advantages 7M

UNIT–II

3. a) What is the significance of 3dB bandwidth? 6M
   b) Explain the frequency response of amplifier at Low, Mid and High frequencies 8M

OR

4. a) A BJT has the following parameters measured at ic=1mA, hie=3KΩ, hfe=500, FT=4MHz, Cc=2pF, Ce=18pF. Find rb!e, gm, rce and fH for RL=1KΩ 6M
   b) The following low frequency parameters are known for a given transistor at room temperature (3000 K) at IC = 10 mA and VCE = 8 volts: hie = 500 Ω, hoe = 2 x 10^{-4} μS, hfe = 100 and hre = 10^{-4}. At the same operating point, fT = 50 MHz and Cob (Cc)=3pF. Calculate the values of hybrid-Π parameters. 8M

UNIT–III

5. When the negative feedback is applied to an amplifier of gain 100, the overall gain falls to 50. Calculate (i) the feedback factor β (ii) if the same feedback factor maintained, the value of the amplifier gains required if the overall gain is to be 75. 14M

OR

6. Derive the expression for input impedance and output impedance for the current series and current shunt feedback amplifiers. 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) What are the features and advantages of crystal oscillator? 7M
   b) With neat diagram explain about frequency stability of oscillators. 7M

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. Draw and explain class B push pull amplifier. Show that in class B push pull amplifier the maximum conversion efficiency is 78.5%. 14M

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Hall Ticket Number :										

R-19

Code: 19AC31T

II B.Tech. I Semester Supplementary Examinations March/April 2023

Partial Differential Equations and Complex Variables

(Common to CE, EEE, ME & ECE)

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	BL
	UNIT–I			
1. a)	Find the L.T of $e^{-3t}\left(2\cos 5t - 3\sin 5t\right)$	7M	1	L1
b)	Find $L\left\{e^{3t}\sin^2 t\right\}$	7M	1	L1
	OR			
2.	Find $L\left\{f(t)\right\}$, where $f(t)$ is aperiodic function of the period $2®$ and it is given by $f(t)=\begin{cases}\sin t, & 0<t<®\\ 0 \ , & ®<t<2®\end{cases}$	14M	1	L3
	UNIT–II			
3. a)	Find $L^{-1}\left\{\dfrac{s+3}{s^2-10s+29}\right\}$	7M	2	L1
b)	Find $L^{-1}\left\{\dfrac{2s+12}{s^2+6s+13}\right\}$	7M	2	L1
	OR			
4.	Using convolution theorem , find $L^{-1}\left\{\dfrac{1}{\left(s^2+a^2\right)^2}\right\}$	14M	2	L3
	UNIT–III			
5.	Express $f(x)=x-®$ as Fourier series in the interval $-® < x < ®$	14M	3	L2
	OR			
6.	Find the Fourier Series to represent $f(x)=x^2-2$ when $-2 \le x \le 2.$	14M	3	L1

UNIT–IV

7. Solve by the method of separation of variables $\frac{\partial^2 z}{\partial x^2} = \frac{\partial z}{\partial y} + 2z$ 14M 4 L3

OR

8. Solve the one dimensional heat equation $\frac{\partial u}{\partial t} = C^2 \frac{\partial^2 u}{\partial x^2}$ subject to the condition

$u(0,t) = 0,\ u(L,t) = 0, t > 0$ *and* $u(x,0) = 3\sin\left(\frac{®x}{L}\right), 0 < x < L.$ 14M 4 L3

UNIT–V

9. a) Find all values of k, such that $f(z) = e^x(\cos ky + i \sin ky)$ is analytic. 7M 5 L1

b) Show that the function $f(z) = z\bar{z}$ is differentiable but not analytic at $z = 0.$ 7M 5 L2

OR

10. Evaluate using Cauchy's theorem $\int_c \frac{z^3 e^{-z}}{(z-1)^3} dz$ where c is $|z-1| = \frac{1}{2}$. Using Cauchy's integral formula. 14M 5 L5

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Hall Ticket Number :										

R-19

Code: 19A432T

II B.Tech. I Semester Supplementary Examinations March/April 2023

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	BL
		UNIT–I			
1.	a)	Define and explain the following with an example: i. Equally likely events ii. Exhaustive events iii. Mutually exclusive events	7M	CO1	L2
	b)	A box contains 4 red and 5 white balls. An experiment is to draw two balls from the box without replacement. What is the probability that the first ball is white and second ball is white?	7M	CO1	L3
		OR			
2.	a)	Give the classical & axiomatic definitions of probability	7M	CO1	L2
	b)	A Single card is drawn from the deck of 52 cards, what is the probability of the following i) Card will be a 10 or greater? ii) Card is greater than 10 iii) Compare the results in i & ii	7M	CO1	L3
		UNIT–II			
3.	a)	Define and explain the classification of a random variable.	7M	CO2	L2
	b)	A random variable X has the density function $f_X(x) = (1/5)u(x)\, e^{-x/5}$. Find the probability of events i) A = {1 < X ≤ 3} ii) B = {X ≤ 2.5} iii) C = {X > 2.5}	7M	CO2	L3
		OR			
4.	a)	Define the exponential random variable function and write its applications	7M	CO2	L2
	b)	What are conditional distribution functions? List properties of conditional distribution function.	7M	CO2	L2
		UNIT–III			
5.		Let X is an exponential density function. Determine Variance, Skew and the coefficient of skewness of X.	14M	CO3	L3
		OR			
6.	a)	Define and explain Moment Generating Function	7M	CO3	L2
	b)	A random variable X has pdf $f_x(x) = (1/b)e^{-(x-a)/b}$. Find its moment generating function and use it to generate first order moment about origin.	7M	CO3	L3
		UNIT–IV			
7.		Explain the joint conditional distribution & density function with relevant expressions	14M	CO3	L2
		OR			
8.		State and explain the Central Limit Theorem.	14M	CO3	L2
		UNIT–V			
9.		What is meant by time average and ergodicity of a random process? Explain their properties.	14M	CO5	L2
		OR			
10.	a)	When do you call two random processes to be jointly wide sense stationary?	7M	CO5	L3
	b)	Find the mean and variance of the given auto correlation function. $R_{XX}(\tau) = 25 + \frac{4}{1+6\tau^2}$.	7M	CO5	L5

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Hall Ticket Number :										

R-19

Code: 19A434T

II B.Tech. I Semester Supplementary Examinations March/April 2023

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) Obtain the expressions to represent trigonometric Fourier coefficients in terms of exponential Fourier coefficients. 7M

   b) Define Fourier series of signal f(t) .Derive the Relationship between various types of Fourier series representation 7M

OR

2. a) Find the even and odd components of the following signal
   x(t) = cost + sint + 2sint + 4cost 7M

   b) Determine whether the following signals are periodic or not? If periodic determine fundamental period.
   i) $\cos t + \sin\sqrt{2}t\cos t$ ii) $2\cos 100\pi t + 5\sin 50t$ 7M

UNIT–II

3. Define Fourier transform. Explain the properties of Fourier transform 14M

OR

4. a) Obtain the Fourier transform of a periodic train of impulses with period T. 7M

   b) Obtain the Fourier transform of the following functions.
   i) Unit step function ii) Unit impulse function 7M

UNIT–III

5. a) What is the impulse response of two LTI systems connected in parallel? 7M

   b) Explain the Filter characteristics of linear systems 7M

OR

6. a) Explain the difference between the following systems.
   i) Linear and non-linear systems. ii) Time variant and time invariant systems 7M

   b) Discuss the conditions for distortionless transmission. 7M

UNIT–IV

7. a) Explain the relation between convolution and correlation. 7M

   b) Derive the relation between PSDs of input and output for an LTI system 7M

OR

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

   b) Prove that auto correlation function and energy/power spectral density function forms Fourier Transform pair. 7M

UNIT–V

9. a) Derive the relation between Z transform and Fourier transform 7M

   b) Discuss any 3 properties of Laplace transform. 7M

OR

10. a) Prove the differentiation property of Z-transform. Explain the concept of ROC in Z transform 7M

    b) Give the relationship between z-transform ,Fourier transform and Laplace Transform 7M

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Hall Ticket Number :										

R-19

Code: 19A433T

II B.Tech. I Semester Supplementary Examinations March/April 2023

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. For a Given 11-bit data word 11001100110,generate the 15-bit hamming code word 14M

OR

2. a) Perform a+b, a*c and c/a operations in a given data a=1001,b=101,c=10001 7M
   b) State and prove the De-Morgan's theorems 7M

UNIT–II

3. 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

OR

4. a) What are the limitations of K-Map method 7M
   b) Realize XOR gate using NAND gates 7M

UNIT–III

5. 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

OR

6. a) Explain basic operation of De-multiplexer 7M
   b) Design a circuit which convert given 4-bit gray code to binary code 7M

UNIT–IV

7. a) Design MOD-63 asynchronous counter 8M
   b) What is meant by race around condition in JK-FF? How to avoid it. 6M

OR

8. a) Design 4-bit twisted Ring counter and explain operation. 7M
   b) Define excitation table, state table and state diagram 7M

UNIT–V

9. a) Derive ASM chart for a JK-FF 7M
   b) List out the salient features of the ASM chart 7M

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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