Hall Ticket Number :										

R-19

Code: 19A243T

II B.Tech. II Semester Supplementary Examinations April 2023

Generation and Transmission of Electric Power

(Electrical and Electronics 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.	Discuss the merits and demerits of steam power plants.	14M	CO1	L2
	OR			
2.	Discuss the boiling water reactor, mentioning its advantages and disadvantages.	14M	CO1	L2
	UNIT–II			
3.	Discuss the concept of geometric mean distance. How is this concept use to find the inductance of composite conductor line?	14M	CO2	L2
	OR			
4.	Discuss the transposition of conductors of a three phase transmission line.	14M	CO2	L2
	UNIT–III			
5.	Obtain A, B, C, D constants for a short transmission line.	14M	CO3	L2
	OR			
6.	Explain the influence of capacitance on performance of loaded line.	14M	CO3	L2
	UNIT–IV			
7.	Determine the voltage across each disc of suspension insulators as a percentage of the line voltage to earth. The self and capacitance to ground of each disc is *C* and 0.2*C* respectively. The capacitance between the link pin and the guard ring is 0.1*C*. (*b*) If the capacitance to the line of the lower link pin were increased to 0.3*C* by means of a guard ring, determine the redistribution of voltage. Also determine the string efficiency in each case.	14M	CO4	L3
	OR			
8.	What is Ferranti effect? Derive and expression for the voltage rise of an unloaded line.	14M	CO4	L2
	UNIT–V			
9.	A single core cable 5 km long has an insulation resistance of 0·4 M ohm. The core diameter is 20 mm and the diameter of the cable over the insulation is 50 mm. Calculate the resistivity of the insulating material.	14M	CO5	L3
	OR			
10.	A single-core 66 kV cable working on 3-phase system has a conductor diameter of 2 cm and a sheath of inside diameter 5.3 cm. If two intersheaths are introduced in such a way that the stress varies between the same maximum and minimum in the three layers, find : (i) positions of intersheaths (ii) voltage on the intersheaths (iii) maximum and minimum stress	14M	CO5	L3

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Hall Ticket Number :										

R-19

Code: 19A244T

II B.Tech. II Semester Supplementary Examinations April 2023

Linear Control Systems

(Electrical and Electronics 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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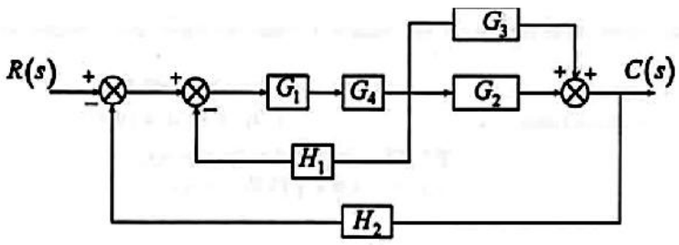
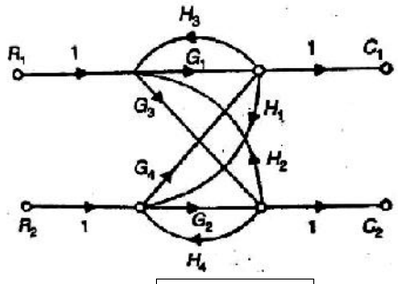
			Marks	CO	BL
		UNIT–I			
1.		Find the closed loop transfer function of the given system using block reduction technique. 	14M	1	2
		OR			
2.		Deduce the output C1 in the given signal flow graph using Mason's gain formula 	14M	1	2
		UNIT–II			
3.		A unity feedback system is characterized by the open loop transfer function G(s) = 10/s*(0.1s+1). Determine the static error constants for the system. Obtain the steady state error when the system is subjected to an input given by the polynomial $r(t) = a_0 + a_1*t + a_2*t^2/2$	14M	2	1
		OR			
4.		Derive the time domain specifications of a second order system	14M	2	1
		UNIT–III			
5.		A unity feedback control system has an open loop transfer function of $G(s) = K/s(s^2+4s+3)$. Sketch the root locus	14M	3	2
		OR			
6.	a)	By Routh stability criterion determine the stability of the system represented by characteristics equation $9S^5-20S^4+10S^3-S^2-9S-10=0$. Comment on the location of characteristic equation.	10M	3	2
	b)	Define stability of a control system	4M	3	1
		UNIT–IV			
7.		Sketch the polar plot for the given transfer function and determine the frequency at which the plot crosses real axis and the corresponding magnitude. $G(S) = 1/[S^2*(1+S)(1+2S)]$.	14M	3	2
		OR			
8.		Sketch the Bode plot and find the Phase margin and gain margin for the system $G(S)H(S) = 10S(3+S)/S(S+2)(S^2+S+2)$.	14M	3	2
		UNIT–V			
9.		A continuous time system has a transfer function T(s)=10(s+4) / s*(s+1) *(s+3). Construct three different state models for the system and give block diagram representation for each state model.	14M	4	2
		OR			
10.	a)	What is state transition matrix? State and prove its properties	7M	4	1
	b)	Derive the expression for transfer function of State Model.	7M	4	1

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Hall Ticket Number :										

R-19

Code: 19AC44T

II B.Tech. II Semester Supplementary Examinations April 2023

Life Sciences for Engineers

(Common to EEE & 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

UNIT–I

1. a) Describe is Nucleus? Write their structure and important functions and draw the labelled diagram? 7M

   b) Describe is mitochondrion? Write their structure and important functions and draw the labelled diagram? 7M

OR

2. a) Describe is Endoplasmic reticulum? Write their structure and important functions and draw the labelled diagram? 7M

   b) Explain the kingdom of Animalia? 7M

UNIT–II

3. Describe the structure of DNA & RNA? 14M

OR

4. Define the proteins? Write the structure and functions of proteins? 14M

UNIT–III

5. a) Explain the Oxidative phosphorylation? 7M

   b) What is neuron? Write their structure with draw the labelled diagram? 7M

OR

6. Explain the reaction of Electron Transport Chain? 14M

UNIT–IV

7. a) Briefly describe the transcription and translation? 7M

   b) Write the types of cell division and signifience of cell division? 7M

OR

8. a) Explain Mendel dihybrid cross experiment? 7M

   b) Describe the sequential steps in the replication of DNA? 7M

UNIT–V

9. a) Explain the Importance of DNA Cloning? 7M

   b) Discuss the application of Recombinant DNA Technology? 7M

OR

10. a) Describe the types of Biosensors? 7M

    b) Write short notes on restriction enzymes? 7M

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Important Note: 1. On completing your answers. Compulsorily draw diagonal cross line on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg. 42+8=50, will be treated as malpractice.

Hall Ticket Number :										

R-19

Code: 19A245T

II B.Tech. II Semester Supplementary Examinations April 2023

Network Analysis and Synthesis

(Electrical and Electronics 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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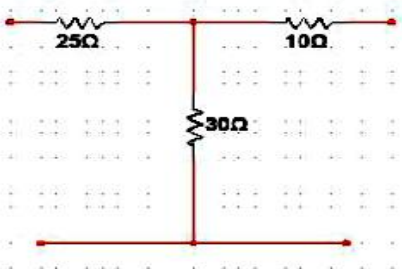
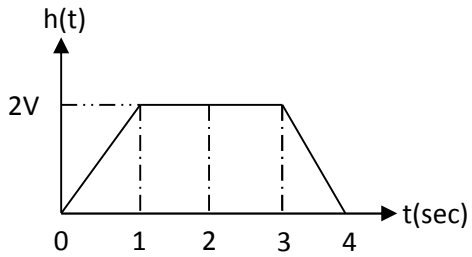
			Marks	CO	BL
		UNIT–I			
1.	a)	Explain the h-parameters of the Two-Port Network.	7M	CO1	L2
	b)	Determine the h-parameters of the Two-Port Network shown below. 	7M	CO1	L3
		OR			
2.	a)	Develop the relationship for 'Z' parameters in terms of 'ABCD' parameters	7M	CO1	L6
	b)	For a given 2-port network has the following Z-parameters Network-1: $V_1=8I_1+3I_2$ and $V_2=4I_1+7I_2$ Determine its ABCD parameters.	7M	CO1	L3
		UNIT–II			
3.	a)	Determine the Laplace transform of the following (i) f(t) = tsin2t (ii) f (t) = $3t^4$- e^{-t} + $4e^{-3t}$ cos5t - $2e^{-4t}$ sinh3t	7M	CO2	L3
	b)	Determine the Laplace transform of the waveform shown below. 	7M	CO2	L3
		OR			
4.	a)	Develop the step response of RLC series circuit using Laplace Transform approach.	14M	CO2	L3
	b)				
		UNIT–III			
5.	a)	Develop the dc transient response of RC series circuit using classical differential equation solvation approach.	7M	CO3	L6
	b)	A series RC circuit with R= 5Ω and C= 0.01μf has a constant voltage V=50v applied at t=0. Determine the expression for the current i(t) using classical differential equation approach.	7M	CO3	L3
		OR			
6.		Develop the transient response of RLC series circuit for sinusoidal excitation using classical differential equation solvation approach.	14M	CO3	L6

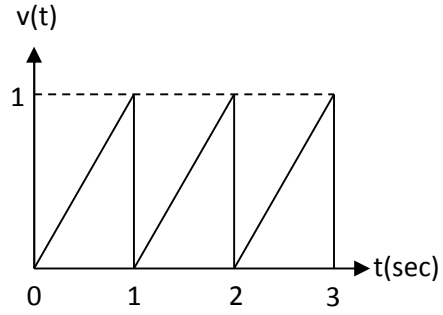
UNIT–IV

7. a) Given that v(t) = (5-10 cos(ωt+60°)) V and i(t) = (5+X cosωt) A where ω=100π rad/s are the voltage across and current through circuit. If the average power delivered to the circuit is zero then Determine the value of 'X' in amperes. 7M CO4 L3

   b) Determine the Fourier transform of the following functions
   (i) $f(t) = e^{-at}$ (ii) $f(t) = \delta(t)$ 7M CO4 L3

OR

8. Determine the exponential Fourier series expansion of the waveform below.



14M CO4 L3

UNIT–V

9. a) Test the following function is Hurwitz or not?
   $H(s) = s^4 + 3s^2 + 2$ 7M CO5 L5

   b) Test the following function is positive real or not?
   $$F(s) = \frac{s^2 + 4}{s^3 + 3s^2 + 3s + 1}$$ 7M CO5 L5

OR

10. a) Determine the Foster form-I realization for the function
   $$F(s) = \frac{(s+1)(s+3)}{(s+2)(s+4)}$$ 7M CO5 L3

   b) Determine the Cauer form-II realization for the function
   $$F(s) = \frac{2(s+1)(s+4)}{(s+2)(s+6)}$$ 7M CO5 L3

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Hall Ticket Number :										

R-19

Code: 19AC42T

II B.Tech. II Semester Supplementary Examinations April 2023

Numerical Methods and Transform Techniques

(Common to EEE &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.		Find the real root of $xe^x - \cos x = 0$ using Bisection Method	14M	CO1	L3
		OR			
2.	a)	Find the real root of $\cos x = xe^x$ using False position Method	7M	CO1	L3
	b)	Construct Newton's forward interpolating polynomial for the following data.			

x	4	6	8	10
y	1	3	8	16

7M CO1 L3

		UNIT–II					
3.	a)	Obtain $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at x=1.2 from the following data					

x	1	1.2	1.4	1.6	1.8	2	2.2
y	2.7183	3.3201	4.1552	4.9530	6.0496	7.3891	9.0250

7M CO2 L3

	b)	Use Runge Kutta method to find y at x=0.1 given that $\frac{dy}{dx} = x + y$ and y=1 when x=0	7M	CO2	L3
		OR			
4.		Given $\frac{dy}{dx} = x^2 + y$, $y(0) = 1$. Determine y(0.02), y(0.04), y(0.06) by Modified Euler's method.	14M	CO2	L3
		UNIT–III			
5.	a)	Expand $f(z) = \frac{1}{z^2 - 3z + 2}$ in the region i) $0 < \lvert z-1 \rvert < 1$, ii) $1 < \lvert z \rvert < 2$	7M	CO3	L2
	b)	Evaluate $\oint_c \frac{dz}{(z^2+4)^2}$ where $c : \lvert z - i \rvert = 2$ using Cauchy Residue theorem.	7M	CO3	L2
		OR			
6.	a)	Find the Talor's series expansion of coshz about $z = ®i$	7M	CO3	L4
	b)	Determine the poles and residues at each pole of the function $f(z) = \frac{z+1}{z^2(z-2)}$	7M	CO3	L3
		UNIT–IV			
7.	a)	Using Fourier integral, show that $e^{-ax} = \frac{2a}{®} \int_0^\infty \frac{\cos ax}{a^2 + a^2} d$a	7M	CO4	L3
	b)	Find the Fourier transform of $f(x) = \begin{cases} 1, \lvert x \rvert < 1 \\ 0, \lvert x \rvert > 1 \end{cases}$ .and hence show that $\int_0^\infty \frac{\sin x}{x} dx = \frac{®}{2}$	7M	CO4	L1
		OR			
8.		Find the Fourier sine transform of $e^{-\lvert x \rvert}$	14M	CO4	L1
		UNIT–V			
9.		If $f(z) = \frac{2z^2 + 3z + 4}{(z-3)^3}$, $\lvert z \rvert > 3$ then find the values of f(1), f(2), f(3).	14M	CO5	L1
		OR			
10.		Find $Z^{-1}\left(\frac{z}{(z-1)(z^2+1)}\right)$	14M	CO5	L1

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Hall Ticket Number :										

R-19

Code: 19A242T

II B.Tech. II Semester Supplementary Examinations April 2023

Electromagnetic Fields

(Electrical and Electronics 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)	Derive the expression for electric field intensity due to infinite sheet of charge ρ_S C/m^2	8M	1	3
	b)	Derive point form of Maxwell's second equations.	6M	1	3
		OR			
2.	a)	State and explain vector form of Coulombs law.	7M	1	2
	b)	Derive the potential at a point P when a charge q is moving from infinite to point P.	7M	1	3
		UNIT–II			
3.	a)	Define potential gradient and derive the relation between E and V	7M	1	1
	b)	A dipole having moment P = 3ax -5ay +10 a_z nCm is located at Q (1, -2, -4) in the space. Find V at P (2, 3, 4).	7M	1	3
		OR			
4.	a)	Derive the expression for the spherical capacitance.	7M	2	3
	b)	Deduce the boundary conditions for dielectric to dielectric with tangential and normal component.	7M	1	4
		UNIT–III			
5.	a)	Determine an expression for H at (0, 0, h) of a circular wire carrying a current I in clockwise direction. The radius of the circle is 'R' and wire is in X-Y plane.	9M	3	3
	b)	A circular loop located on $X^2+Y^2=9$, z=0 carries a current of 10A along a_Φ. determine H at (0,0,4)	5M	3	3
		OR			
6.	a)	Derive Maxwell's fourth equation in static magnetic field.	7M	3	3
	b)	Derive the expression for magnetic field intensity due to an Infinite conductor carrying a current I Using ampere's circuital law.	7M	3	3
		UNIT–IV			
7.	a)	Evaluate the magnetic force due to a moving point charge in the magnetic field.	7M	3	3
	b)	A negative charge Q= -40nc is moving with a velocity of $6X10^{-6}$ m/sec in a direction specified by the Unit vector $a_v = -0.48a_x-0.6a_y+0.64a_z$. Find the magnitude of vector force exerted by the field $\vec{B} = 2a_x-3a_y+5a_z$ T, $\vec{E}= 2a_x-3a_y+5a_z$ Kv/m.	7M	3	3
		OR			
8.	a)	Describe the classification of magnetic materials with examples.	7M	4	2
	b)	Derive the expression for magnetic force on a current element in the external magnetic field.	7M	3	3
		UNIT–V			
9.		Explain Faraday's laws of Electromagnetic Induction and Derive the expression for static induced emf and dynamic induced emf.	14M	5	2
		OR			
10.	a)	Explain Faraday's laws of Electromagnetic Induction and Derive the expression for dynamic induced emf.	7M	5	2
	b)	A circular cross section conductor of radius 3 mm carries a current Ic = 5 sin (6 X 108) μA what is the amplitude of the displacement current density if σ = 40 ms/m and ε_r =1.	7M	5	3

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Hall Ticket Number :										

R-19

Code: 19A241T

II B.Tech. II Semester Supplementary Examinations April 2023

Electrical Machines-II

(Electrical and Electronics 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)	Write the comparison between cage rotor and slip ring rotor with neat diagrams	6M	1	1
	b)	Obtain the relation between rotor input, rotor copper losses and rotor output in terms of slip(s).	8M	2	2
		OR			
2.	a)	Derive the expression for maximum torque developed by the 3-Ph induction motor.	7M	1	2
	b)	A 4 pole, 50Hz, 3-Ph IM has a starting torque of 1.6 and maximum torque of 2 times the full load torque at rated voltage and frequency. Determine the slip at maximum torque and speed at maximum torque.	7M	2	3
		UNIT–II			
3.	a)	Explain the speed control of induction motor using Rotor resistance control.	6M	3	2
	b)	Two 50 Hz, 3-Φ induction motor having 6 and 4-poles respectively are cumulatively cascaded. The 6-pole motor being connected to the main supply. Determine frequencies of rotor currents and the slips referred to each stator field. If the set has slip of 2%.	8M	3	3
		OR			
4.	a)	List the speed control methods of induction motor from (i) Stator side (ii) Rotor side.	4M	1	1
	b)	The rotor of a 4 pole, 50Hz, SRIM has a resistance of 0.3ohms/ph and runs at 1440 rpm at full load. Calculate the external resistance/ph which must be added to lower the speed to 1320 rpm, the torque being the same as before.	10M	3	3
		UNIT–III			
5.		Write a short note on (i) Capacitor Start Induction motor (ii) Capacitor Start-Run Induction motor	14M	2	2
		OR			
6.		Explain the construction and working of shaded pole Induction motor. Mentions its applications.	14M	2	2
		UNIT–IV			
7.	a)	Derive the generalized expression for an induced emf/ph in 3-ph alternator having fractional pitch and distributed winding.	7M	5	2
	b)	A three phase, 50 Hz, star connected alternator has a double layer winding distributed in 36 slots, each slot containing 16 conductors. The flux per pole is 0.04 wb. Evaluate the terminal emf at open circuit.	7M	4	2
		OR			
8.	a)	Develop the expression for distribution factor of a 3-Ph synchronous machine from fundamental.	7M	6	2
	b)	Determine the distribution factor for 1-Ph alternator having 6 slots/pole (i) When all the slots are wound. (ii) When only four adjacent slots/pole are wound.	7M	4	2
		UNIT–V			
9.		List the methods of synchronizing 3-Ph alternator to the infinite bus bar. Explain two bright and one dark lamp, synchroscope method with neat diagram.	14M	6	2
		OR			
10.	a)	Explain why the 3 – Ph synchronous motor is not a self-starting motor?	7M	5	2
	b)	Explain the effect of change of mechanical power input of alternator when it is connected to Infinite bus bar.	7M	6	2

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