Hall Ticket Number :										

R-19

Code: 19A244T

II B.Tech. II Semester Supplementary Examinations November 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.	a)	Distinguish open loop and closed loop control system	6M	1	2
	b)	Derive the transfer function of an ac servo motor	8M	1	2
		OR			
2.	a)	Derive the transfer function of armature-controlled dc motor	6M	1	2
	b)	Explain the effect of feedback in reducing parameter variations.	8M	1	1
		UNIT–II			
3.	a)	A unity feedback control system has an open loop transfer function of $G(s) = K/ s(s^2+4s+3)$. Sketch the root locus	7M	2	1
	b)	For the given system, Sketch the root locus and find the steady state error constants for unit step, unit ramp and unit parabolic input $G(s) = 1/ s^2+s+2)$ and $H(s) = 1/(s+1)$, $(t^2/2)\,u(t)$	7M	2	1
		OR			
4.		A unity feedback system is characterized by the open loop transfer function G(s) = 1/s*(0.5s+1) (0.2s+1). Determine the steady state error for unit step, unit ramp and unit acceleration inputs.	14M	2	2
		UNIT–III			
5.		Find the roots of the characteristic equations for systems whose open loop transfer functions are given below: i) G(s) H(s)= 1/ [(s+2) (s+4)] ii) G(s)H(s) = 1(s+3) / [s(s+3) (s+8)] iii) G(s) = 9 / [s2*(s+2)].	14M	3	2
		OR			
6.		Sketch the root locus of the system whose open loop transfer function $G(s) = K /S(S+2)(S+4)$. Find the value of K so that the damping ratio of the closed loop system is 0.5	14M	3	2
		UNIT–IV			
7.		Sketch the bode plot of a feedback system which has G(S)H(S) = 100*(S+4) / [S*(S+0.5) *(S+10)]. Also comment on the stability of the system.	14M	3	2
		OR			
8.		Sketch the Polar plot for a system with loop transfer function $G(S)H(S) = K(1+S)^2/ S^3$. Find the range of value of K for which the system is stable.	14M	3	2
		UNIT–V			
9.		Explain design of the basic lead compensator using Bode plot	14M	4	1
		OR			
10.		Obtain the state space representation of the field controlled and Armature controlled DC motor	14M	4	2

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Hall Ticket Number :										

R-19

Code: 19AC44T

II B.Tech. II Semester Supplementary Examinations November 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	CO	BL
		UNIT–I			
1.	a)	Explain the hierarchy of classification?	7M	CO1	2
	b)	Describe is Ribosomes? Write their structure and important functions and draw the labelled diagram?	7M	CO1	2
		OR			
2.		Describe meant by classification? Write the importance of Classification?	14M	CO1	2
		UNIT–II			
3.		Describe nucleic acids? Write the structure and functions of nucleic acids?	14M	CO2	2
		OR			
4.		Describe the Biomolecules and write functions and types of biomolecules?	14M	CO2	4
		UNIT–III			
5.		Explain the reaction of Krebs/TCA cycle?	14M	CO3	2
		OR			
6.		Describe the structure of neuron and types? Give an account of the Synaptic and neuromuscular junctions?	14M	CO3	4
		UNIT–IV			
7.		Describe the meiosis cell division process?	14M	C04	2
		OR			
8.		Explain the Process of DNA Replication in prokaryotic and eukaryotic animals?	14M	C04	2
		UNIT–V			
9.		Explain the Transgenic species and process in animals?	14M	CO5	2
		OR			
10.		Explain the various process of recombinant DNA technology?	14M	CO5	2

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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. 32+8=40, will be treated as malpractice.

Hall Ticket Number :										

R-19

Code: 19A245T

II B.Tech. II Semester Supplementary Examinations November 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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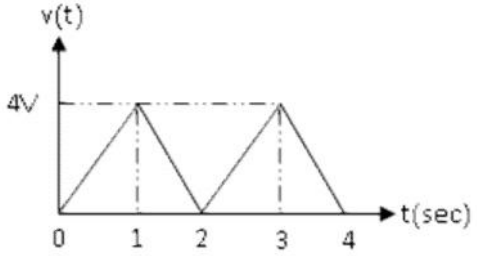
			Marks	CO	BL
		UNIT–I			
1.	a)	Explain the Parallel connection of Two Two-Port Networks.	7M	CO1	L2
	b)	Two, 2-port networks are connected in parallel. The Y-parameters of the networks are given below: $Y_A = \begin{bmatrix} \frac{1}{2} & -\frac{1}{2} \\ -\frac{1}{2} & \frac{1}{2} \end{bmatrix}$ $Y_B = \begin{bmatrix} \frac{1}{5} & -\frac{1}{10} \\ -\frac{1}{10} & \frac{3}{10} \end{bmatrix}$ Determine Z-parameters of the combination.	7M	CO1	L3
		OR			
2.	a)	Explain the Cascade connection of Two Two-Port Networks.	7M	CO1	L2
	b)	Two, 2-port networks are connected in cascade. The Z-parameters of the networks are given below: Network-1: $V_1=8I_1+3I_2$ and $V_2=4I_1+7I_2$ Network-2: $V_1=2I_1+I_2$ and $V_2=I_1+2I_2$ Determine the ABCD parameters of the overall network.	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.		Develop the step response of RL series circuit using Laplace Transform approach.	14M	CO2	L3
		UNIT–III			
5.		Develop the dc transient response of RLC series circuit using classical differential equation solvation approach.	14M	CO3	L6
		OR			
6.	a)	Explain the importance of Initial Conditions.	10M	CO3	L2
	b)	Define the time constant of RL and RC series circuit.	4M	CO3	L1

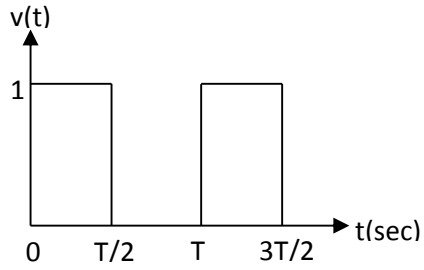
UNIT–IV

7. In a two-element series network, voltage v(t) is applied, which is given as v(t) = 50 + 50 sin5000t + 30 sin10000t, the resultant current is given as i(t) = 11.2 sin(5000t+63.4°) + 10.6 sin(10000t+45°). Determine the network elements and the power dissipated in the circuit. 14M CO4 L3

OR

8. a) List out the properties of Fourier transforms. 7M CO4 L1

   b) Determine the Fourier Transform of the periodic waveform shown below.



7M CO4 L3

UNIT–V

9. a) Determine the Foster form-II realization for the function

$$Z(s)=\frac{2(s+1)(s+3)}{s(s+2)(s+4)}$$

7M CO5 L3

   b) Determine the Cauer form-II realization for the function

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

7M CO5 L3

OR

10. a) Test the following function is Hurwitz or not?

$$H(s)=s^5+3s^4+5s^3+9s^2+10s+27$$

7M CO5 L5

   b) Test the following function is positive real or not?

$$F(s)=\frac{s^2+5s+6}{s^3+6s^2+9s}$$

7M CO5 L5

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Hall Ticket Number :										

R-19

Code: 19AC42T

II B.Tech. II Semester Supplementary Examinations November 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. Estimate the value of f(22) and f(42) from the following data.

x	20	25	30	35	40	45
f(x)	354	332	291	26-	231	204

14M CO1 L2

OR

2. a) Find the real root of $x\log_{10} x = 1.2$ using False position Method — 7M CO1 L3

b) Using lagrange's interpolation formula find y at x=10 given that

x	5	6	9	11
y	12	13	14	16

7M CO1 L3

UNIT–II

3. a) Compute $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at x=1 from the following data.

x	1	2	3	4	5	6
y	1	8	27	64	125	216

7M CO2 L3

b) Solve $\frac{dy}{dx} = x + y^2$, $y(1) = 0$ to find y at x=0.2 by Runge-Kutta method of fourth order. — 7M CO2 L3

OR

4. a) Estimate $\int_0^1 \frac{1}{1+x^2}\,dx$ by using Simpon's 1/3 rule — 7M CO2 L2

b) Solve $y' = 3x + y^2$, $y(0) = 1$ using Taylor's series method and compute y(0.1) — 7M CO2 L3

UNIT–III

5. a) Find the Laurent series expansion of the function

$f(z) = \frac{z^2 - 6z - 1}{(z-1)(z-3)(z+2)}$ in the region $3 < |z+2| < 5$ — 7M CO3 L4

b) Find the residues of $f(z) = \frac{z^2 - 2z}{(z+1)^2(z^2+1)}$ at each pole — 7M CO3 L1

OR

6. Find the Laurent series of $f(z) = \frac{z+3}{z(z^2 - z - 2)}$ in the region i) $|z| < 1$, ii) $1 < |z| < 2$ iii) $|z| > 2$ — 14M CO3 L4

UNIT–IV

7. Find the Fourier transform of $e^{-a^2x^2}, a < 0$.Hence deduce that $e^{\frac{-x^2}{2}}$ is self reciprocal in respect of Fourier transform. — 14M CO4 L4

OR

8. a) Find the Fourier sine transform of $2e^{-5x} + 5e^{-2x}$ — 7M CO4 L1

b) Find the Fourier cosine transform of $f(x) = \begin{cases} x, 0 < x < 1 \\ 2 - x, 1 < x < 2 \\ 0, x \geq 2 \end{cases}$ — 7M CO4 L1

UNIT–V

9. Find inverse Z transform of $\frac{2z^2 + 3z}{(z+2)(z-4)}$ — 14M CO5 L1

OR

10. a) Find $Z(n^2 a^n)$ — 7M CO5 L1

b) Find $Z(e^t \sin 2t)$ — 7M CO5 L1

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Hall Ticket Number :										

R-19

Code: 19A241T

II B.Tech. II Semester Supplementary Examinations November 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 three phase, 400 V, 50 Hz induction motor takes a power input of 35 kW at its full load speed of 980 rpm. The total stator losses are 1 kW and the friction and windage losses are 1.5 kW. Calculate (i) slip (ii) rotor ohmic losses (iii) shaft power (iv) shaft torque and (v) efficiency	14M	2	3
		OR			
2.	a)	Write the comparison between cage rotor and slip ring rotor with neat diagrams	7M	1	1
	b)	Write short note on (i) Double cage rotor (ii) Deep bar rotor	7M	1	1
		UNIT–II			
3.	a)	Explain the principle of operation of an induction generator.	7M	1	2
	b)	The rotor resistance and standstill reactance per phase of a 3 phase slip-ring induction motor are 0.05Ω and 0.2Ω respectively. What should be the value of external resistance per phase to be inserted in the rotor circuit to give maximum torque at starting?	7M	2	3
		OR			
4.	a)	Explain the Star-Delta starter with diagram. Derive the expression for starting toque to full load torque. Mention its limitations.	7M	3	2
	b)	A 4 pole IM and 6 pole IM are connected in cumulative cascade. The frequency in the secondary circuit of the 6 pole motor is observed to be 1Hz. Determine the slip in each machine and combined speed of the set. Take the supply frequency as 50Hz.	7M	3	3
		UNIT–III			
5.		Explain how the equivalent circuit parameters of 1-Ph Induction motor are obtained by conducting the No load and blocked rotor tests.	14M	4	2
		OR			
6.		Explain the construction and working of Split Phase and Capacitor Start-Run Induction motor. Mentions its applications.	14M	2	2
		UNIT–IV			
7.	a)	What are harmonics? Explain the causes for harmonics.	7M	5	1
	b)	3-Ph, Y connected alternator has following data: Voltage generated on O.C is 4000V at 50Hz, Speed is 500 rpm, stator slots/pole/ph is 3, conductors/slot is 12. Compute the no. of poles and useful flux/pole. Assume all conductors/ph to be connected in series and coil to be full pitched.	7M	4	3
		OR			
8.	a)	Discuss the procedural steps to be followed for finding the voltage regulation of alternator using MMF method.	7M	5	2
	b)	Find the voltage regulation at full load, 0.9 power factor lagging for a three phase, 1000 kVA, 5000V, star connected alternator having an armature resistance of 0.08Ω per phase and a synchronous reactance of 7Ω per phase.	7M	4	3

UNIT–V

9.	a)	Name the different starting methods of synchronous motor, explain how the synchronous motor can start with help of damper winding.	8M	1	2
	b)	State the main features of synchronous motor. Mention its applications.	6M	1	1
		OR			
10.		A 3 - Ph, 500V, synchronous motor draws a current of 50A from the supply while driving certain load. The stator is star connected with armature resistance of 0.4Ω/ph, synchronous reactance is 4Ω/ph. Find the p.f at which motor would operate when field current is adjusted to give the generated e.m.f as i) 660V and ii) 380V.	14M	4	3

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Hall Ticket Number :										

R-19

Code: 19A243T

II B.Tech. II Semester Supplementary Examinations November 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 factors to be taken into account while selecting the site for a thermal power station.	14M	CO1	L2
	OR			
2.	Discuss the advantages and disadvantages of a nuclear power plant as compared to other conventional power plants.	14M	CO1	L2
	UNIT–II			
3.	Why transposition of conductors in a three phase transmission lines is essential?	14M	CO2	L2
	OR			
4.	Differentiate between bundled and composite conductors.	14M	CO2	L2
	UNIT–III			
5.	Obtain the expression of voltage regulation and efficiency of a short transmission line in terms of line parameters.	14M	CO3	L2
	OR			
6.	The ABCD constants of a three phase transmission lines are A=D=0.936+j0.016, B=33.5+j1.38 ohms and C=(-0.9280+j901.223)x10^{-6} mho. The load at the receiving end is 40MW at 200 kV with pf of 0.86 lagging. Find the magnitude of the sending end voltage, current, power and voltage regulation. Assume that the magnitude of the sending end voltage remains constant.	14M	CO3	L3
	UNIT–IV			
7.	The towers of height 30 m and 90 m respectively support a transmission line conductor at water crossing. The horizontal distance betwen the towers is 500 m. If the tension in the conductor is 1600 kg, find the minimum clearance of the conductor and water and clearance mid-way between the supports. Weight of conductor is 1·5 kg/m. Bases of the towers can be considered to be at water level.	14M	CO4	L3
	OR			
8.	Explain Ferranti effect and proximity effect.	14M	CO4	L2
	UNIT–V			
9.	A single core lead sheathed cable has a conductor diameter of 3 cm; the diameter of the cable being 9 cm. The cable is graded by using two dielectrics of relative permittivity 5 and 4 respectively with corresponding safe working stresses of 30 kV/cm and 20 kV/cm. Calculate the radial thickness of each insulation and the safe working voltage of the cable.	14M	CO5	L3
	OR			
10.	Describe with a neat sketch the construction of a 3-core belted type cable. Discuss the limitations of such a cable.	14M	CO5	L2

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