Hall Ticket Number :										

R-19

Code: 19A243T

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

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	Blooms Level
	UNIT–I			
1.	Write the advantages, disadvantages and applications of hydroelectric power plant.	14M	CO1	L1
	OR			
2.	Discuss why the overall efficiency of thermal power plant is very low.	14M	CO1	L2
	UNIT–II			
3.	Derive an expression for inductance of a single phase transmission line.	14M	CO2	L2
	OR			
4.	Derive expression for line to line capacitance and line to neutral capacitance of a single phase line.	14M	CO2	L2
	UNIT–III			
5.	Explain the effect of load power factor on the transmission efficiency and voltage regulation of transmission line.	14M	CO3	L2
	OR			
6.	How are transmission lines classified? Obtain the relation between the sending end and receiving end voltages and current of a medium line using nominal-π representation.	14M	CO3	L2
	UNIT–IV			
7.	An overhead transmission line at a river crossing is supported from two towers at heights of 40 m and 90 m above water level, the horizontal distance between the towers being 400 m. If the maximum allowable tension is 2000kg, find the clearance between the conductor and water at a point mid-way between the towers. Weight of conductor is 1 kg/m.	14M	CO4	L3
	OR			
8.	A transmission line has a span of 150 m between level supports. The conductor has a cross-sectional area of 2 cm^2. The tension in the conductor is 2000 kg. If the specific gravity of the conductor material is 9·9 gm/cm^3 and wind pressure is 1·5 kg/m length, calculate the sag. What is the vertical sag?	14M	CO4	L3
	UNIT–V			
9.	A single core cable of conductor diameter 2 cm and lead sheath of diameter 5.3 cm is to be used on a 66 kV, 3-phase system. Two intersheaths of diameter 3·1 cm and 4·2 cm are introduced between the core and lead sheath. If the maximum stress in the layers is the same, find the voltages on the intersheaths.	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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Hall Ticket Number :										

R-19

Code: 19A244T

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

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	Blooms Level
		UNIT–I			
1.	a)	Derive an expression for the transfer function of an armature controlled DC servo motor.	8M	1	2
	b)	Distinguish open loop and closed loop control system	6M	1	2
		OR			
2.	a)	Explain the effect of feedback in reducing parameter variations.	8M	1	1
	b)	Derive an expression for the transfer function of a Field controlled DC servo motor.	6M	1	2
		UNIT–II			
3.		Determine the time response of a second order system with a unit step input. Also deduce the steady state error value	14M	2	1
		OR			
4.		Obtain the rise time , peak time, maximum peak overshoot and settling time of the unit step response of a closed loop control system given by $G(s) = 36/(s^2+2s+36)$	14M	2	2
		UNIT–III			
5.	a)	A system has $G(s)H(s) = K/s(s+2)(s+4)(s+8)$. Where K is positive. Determine the range of K for stability.	7M	3	2
	b)	Discuss the effect of adding a pole/zero to the open loop transfer function and its effect on the root locus of a system	7M	3	2
		OR			
6.	a)	Explain the construction rules for root locus technique	7M	3	1
	b)	Test the stability of the system with the following characteristic equation by Routh's test $s^6+2s^5+8s^4+20s^2+16s+16=0$	7M	3	2
		UNIT–IV			
7.		Sketch the Nyquist 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
		OR			
8.		Explain bode plots of basic factors of a transfer function.	14M	3	1
		UNIT–V			
9.		Derive the transfer function of Lag, Lead and Lag-Lead compensator using electrical network	14M	4	2
		OR			
10.	a)	A continuous time system has a transfer function of $T(s) = (s^2+3s+3) / (s^3+2s^2+3s+1)$. Construct a state model of the system	7M	4	1
	b)	What do you understand by state transition matrix? State and prove its properties	7M	4	1

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Hall Ticket Number :										

R-19

Code: 19AC44T

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

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	Blooms Level
		UNIT–I			
1.	a)	Describe is Nucleus? Write their structure and important functions and draw the labelled diagram?	7M	CO1	2
	b)	Write about the Characteristics of Cells?	7M	CO1	1
		OR			
2.		Explain the comparison of biological organisms with manmade systems?	14M	CO1	2
		UNIT–II			
3.		Describe are the Carbohydrates? Write the types and functions of carbohydrates?	14M	CO2	2
		OR			
4.		Explain the Hemoglobin and Write the functions of Hemoglobin?	14M	CO2	2
		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.		Define the genetics? Explain the Mendel's Laws?	14M	C04	1
		OR			
8.		Describe the meiosis cell division process?	14M	C04	2
		UNIT–V			
9.		Describe the Recombinant Vaccines?	14M	CO5	2
		OR			
10.		Explain the various process of recombinant DNA technology?	14M	CO5	2

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Hall Ticket Number :										

R-19

Code: 19A245T

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

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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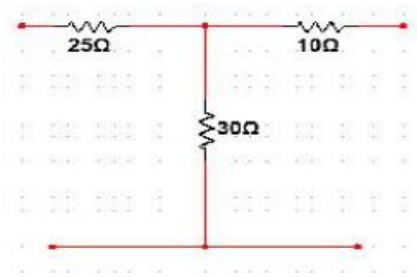
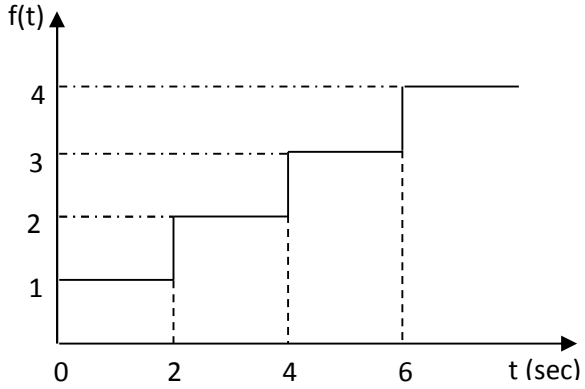
			Marks	CO	Blooms Level
		UNIT–I			
1.	a)	Explain the Z-parameters of the Two-Port Network.	7M	CO1	L2
	b)	Determine the Z-parameters of the Two-Port Network shown below.			



			7M	CO1	L3
		OR			
2.	a)	Explain the Series connection of Two Two-Port Networks.	7M	CO1	L2
	b)	Two, 2-port networks are connected in series. The Z-parameters of the networks are given below: $Z_A = \begin{bmatrix} 11 & 3 \\ 4 & 5 \end{bmatrix}$ $Z_B = \begin{bmatrix} 2 & 1 \\ 1 & 2 \end{bmatrix}$ Determine Y-parameters of the combination.	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)	Explain Initial value and Final value Theorem.	7M	CO2	L2
	b)	State and prove Initial Value and Final value Theorem for the function f(t) = 2+e^{-3t}cos2t	7M	CO2	L2

UNIT–III

5.	a)	Explain the importance of Initial Conditions.	10M	CO3	L2
	b)	Define the time constant of RL and RC series circuit.	4M	CO3	L1

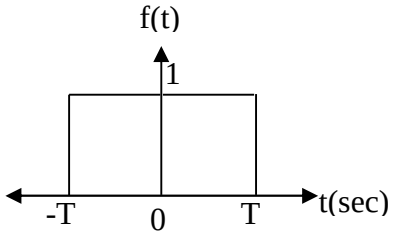
OR

6.	a)	Develop the transient response of RL series circuit for sinusoidal excitation using classical differential equation solvation approach.	7M	CO3	L6
	b)	A Series RL circuit with R=50Ω and L=0.2H, has a sinusoidal voltage v(t) = 150 sin 500t applied at t=0. Determine the current i(t) for t > 0 using classical differential equation approach.	7M	CO3	L3

UNIT–IV

7.	a)	Explain all symmetry properties such as even function, odd function and halfwave symmetry of the waveform with examples.	7M	CO4	L2
	b)	Determine the value of R, if the average power dissipated is 1000W if the voltage has the following Fourier series v(t) = 200 sinωt + 100 sin3ωt+50 sin5ωt.	7M	CO4	L3

OR

8.	a)	Determine the Fourier transform of the following functions (i) f(t) = 1 (ii) f(t) = u(t)	7M	CO4	L3
	b)	Determine the Fourier Transform of the waveform shown below.  	7M	CO4	L3

UNIT–V

9.	a)	List out the necessary conditions for a driving point function?	7M	CO5	L1
	b)	Draw the pole-zero diagram of the following driving point impedance function $Z(s) = \frac{s^2 + 5s + 6}{s^3 + 6s^2 + 9s}$.	7M	CO5	L4

OR

10.	a)	Test the following function is Hurwitz or not? $H(s) = s^5 + s^3 + s$	7M	CO5	L5
	b)	Test the following function is positive real or not? $F(s) = \frac{s + 6}{s^2 + 4s + 2}$	7M	CO5	L5

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Hall Ticket Number :										

R-19

Code: 19AC42T

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

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	Blooms Level
		UNIT–I			
1.		Find the real root of $x^3 - x - 1 = 0$ using Bisection Method	14M	CO1	L3
		OR			
2.	a)	Find the real root of $x^3 - 2x - 5 = 0$ using Bisection Method	7M	CO1	L3
	b)	Find f(3) using Lagrange's formula for the following data			

x	0	1	2	5
f(x)	2	3	12	147

7M CO1 L3

		UNIT–II			
3.		Evaluate $\int_0^6 \frac{1}{1+x^2}\,dx$ using i)Trapezoidal rule ii)Simpson's 1/3 rule, iii) Simpson's 3/8 rule and compare with exact solution	14M	CO2	L4
		OR			
4.	a)	Compute the value of $\int_{0.2}^{1.4} (\sin x - \log x + e^x)dx$ using Simpson's 3/8 rule	7M	CO2	L3
	b)	Using Modified Euler's method, find y(0.2) given $y' = y + e^x$, $y(0) = 0$.	7M	CO2	L3
		UNIT–III			
5.		Use Cauchy Residue theorem to find $\oint_c \frac{4-3z}{z(z-1)(z-2)}dz$, where 'c' is the circle $\lvert z\rvert = \frac{3}{2}$	14M	CO3	L3
		OR			
6.		Find Taylor's expansion of $f(z) = \frac{1}{(z+1)^2}$ about the point z=-i	14M	CO3	L4
		UNIT–IV			
7.		Find the Fourier transform of $f(x) = \begin{cases} 1-x^2, \lvert x\rvert \le 1 \\ 0, \lvert x\rvert > 1 \end{cases}$ .Hence evaluate $\int_0^\infty \frac{x\cos x - \sin x}{x^3}\cos\frac{x}{2}\,dx$	14M	CO4	L2
		OR			
8.		Find the Fourier cosine transform of e^{-x^2}	14M	CO4	L1
		UNIT–V			
9.		Use Convolution theorem to evaluate $Z^{-1}\left(\frac{z^2}{(z-a)(z-b)}\right)$	14M	CO5	L3
		OR			
10.		If $U(z) = \frac{2z^2+5z+14}{(z-1)^4}$ then evaluate u_2 and u_3	14M	CO5	L2

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Hall Ticket Number :										

R-19

Code: 19A241T

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

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	Blooms Level
		UNIT–I			
1.	a)	Describe the construction of a 3-phase cage type induction motor with neat sketch.	8M	1	2
	b)	A 3-phase, 50Hz, 4-pole induction motor has a slip of 4%. Calculate speed of the motor and frequency of rotor e.m.f.	6M	2	2
		OR			
2.	a)	With neat sketch, explain how rotating magnetic field is produced in a three phase induction motor.	8M	2	1
	b)	Explain the phenomenon of crawling and cogging. Also explain it effect.	6M	1	2
		UNIT–II			
3.	a)	Explain the working principle of Induction generator.	7M	2	1
	b)	Explain the conducting procedure of Blocked rotor test on three phase induction motor.	7M	1	2
		OR			
4.	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
		UNIT–III			
5.		Explain the construction and working of Split Phase and Capacitor Start-Run Induction motor. Mentions its applications.	14M	2	2
		OR			
6.	a)	Explain the construction of 1-Ph Induction motor using neat diagrams.	6M	1	2
	b)	Write a short note on Permanent capacitor Induction motor. Mentions its applications.	8M	2	1

UNIT–IV

7.	a)	Explain how the harmonics in the generated EMF can be suppressed in synchronous machines.	7M	5	2
	b)	A 3-Ph, 50 Hz, 8 pole alternator has a star connected winding with 120 slots and 8 conductors/slot. The flux per pole is 0.05wb, sinusoidally distributed. Determine the phase and line voltages. Let the winding factor as 0.956.	7M	4	3

OR

8.		Classify and explain various types of armature windings of synchronous machine with its advantages.	14M	3	2

UNIT–V

9.	a)	Discuss the need for connecting the alternators in parallel. Mention the conditions for parallel operation of alternators.	7M	5	2
	b)	Two similar turbo alternators are rated at 25MW each. They are running in parallel. The speed-load curves of the driving turbines are such that the frequency of alternator-1 drops uniformly from 50Hz no load to 48Hz on full load and that alternator-2 from 50Hz to 48.5Hz. How will the two machines share a load of 30MW?	7M	4	3

OR

10.	a)	Discuss the effect of change of excitation of alternator when it is connected to Infinite bus bar.	6M	4	2
	b)	Two 15KVA, 400V, 3-Ph alternators in parallel supply a total load of 25KVA at 0.8 p.f lagging. If one alternator shares half the power at UPF, determine the p.f and KVA shared by other alternator.	8M	4	3

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