Hall Ticket Number :										

R-19

Code: 19A233T

II B.Tech. I Semester Supplementary Examinations November 2023

Electrical Machines – I

(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)	What are the lap and wave windings and compare them.	7M	1	1
	b)	An 8-pole lap wound DC. Generator has 120 slots having 4 conductors per slot. If flux per pole is 0.06Wb, calculate the speed of the generator for giving 240V on open circuit.	7M	1	2
		OR			
2.		Give the constructional features and working principle of a D.C generator. Draw the cross-sectional view of a 4-pole generator and label all the parts.	14M	1	2
		UNIT–II			
3.		Discuss, in detail, the DC generators based on the methods of excitation.	14M	2	2
		OR			
4.		Illustrate the open circuit and load characteristics of DC compound generator with neat diagrams.	14M	2	2
		UNIT–III			
5.		Explain with a circuit diagram how efficiency is determined for machines by Hopkinson's test.	14M	3	2
		OR			
6.		A DC shunt motor runs at 1000rpm on 220V supply. Its armature and field resistances are 0.5Ω and 110Ω respectively and the total current taken from the supply is 26A. It is desired to reduce the speed to 750rpm keeping the armature and field currents same. What resistance should be inserted in the armature circuit?	14M	3	3
		UNIT–IV			
7.	a)	Explain the effect of variations of frequency and supply voltage on core losses.	7M	4	2
	b)	Explain the losses that occur in Transformers	7M	4	1
		OR			
8.	a)	Define efficiency of a transformer and obtain the condition for maximum efficiency a transformer.	7M	4	2
	b)	At 400 V and 50 Hz the core loss of a transformer was found to be 2400 W. When the transformer is supplied at 200 V and 25 Hz, the core loss is 800 W. Calculate the hysteresis and eddy current loss at 400 V and 50 Hz.	7M	4	3
		UNIT–V			
9.		Explain with the help of connection and phasor diagram, how the Scott connections are used to obtain two-phase supply from 3 – phase supply mains.	14M	5	2
		OR			
10.		A 50 kVA, 2200 V/1100 V single phase 50 Hz transformer has a full-load efficiency of 95% and iron loss of 500 W. The transformer is connected as an Auto-transformer to a 3300 V supply. When it delivers a load of 50 kW at unity power factor at 1100 V, Calculate the currents in the windings. Also calculate the copper losses as two winding transformer.	14M	5	3

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Hall Ticket Number :										

R-19

Code: 19A337T

II B.Tech. I Semester Supplementary Examinations November 2023

Fluid Mechanics and Hydraulic Machinery

(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

UNIT–I

1. a) Define the following,
   i) Steam Line ii) Streak Line iii) stream Tube 6M
   b) Calculate the Density, Specific weight and Specific gravity of One liter of liquid, which weighs 7N. 8M

OR

2. a) Explain the property viscosity of a fluid. Also describe its variation with temperature. 7M
   b) The diameters of a pipe at sections 1 and 2 are 10cm and 15cm respectively. Find the discharge through the pipe if the velocity of water flowing through the pipe at section 1 is 5 m/sec. Determine also the velocity at section 2. 7M

UNIT–II

3. a) Explain the TEL and HGL with neat sketch. 7M
   b) Explain the minor losses in pipes briefly. 7M

OR

4. a) Derive an expression for rate of flow through venturimeter. 7M
   b) At a sudden enlargement of water main from 240 mm to 480 mm diameter, the hydraulic gradient rises by 10 mm. Estimate the rate of flow. 7M

UNIT–III

5. a) What is pumped storage power plant and explain its concept. 7M
   b) Derive an expression for force exerted by the jet on the flat vertical plate moving in the direction of the jet. 7M

OR

6. a) Describe the various storage requirements of hydroelectric power station. 7M
   b) Derive the expression for a force exerted by jet of water on a stationary inclined plate. 7M

UNIT–IV

7. a) Explain the classification of turbines. 7M
   b) Define the unit quantities and describe them with expressions 7M

OR

8. a) Explain the Draft tube theory and list out its functions. 8M
   b) A water turbine has a velocity of 6 m/sec at the entrance to the draft tube and velocity of 1.2 m/sec at the exit. For friction losses of 0.1m and tail water 5m below the entrance to the draft tube, find the pressure head at the entrance. 6M

UNIT–V

9. a) Explain about the various losses in the centrifugal pumps. 7M
   b) Derive an expression for the work done by the impellor of a centrifugal pump. 7M

OR

10. a) Explain the working of double acting reciprocating pump with neat sketch. 7M
    b) Describe the meaning of NPSH and derive an expression for it. 7M

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Hall Ticket Number :										

R-19

Code: 19AC31T

II B.Tech. I Semester Supplementary Examinations November 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)	Evaluate $L\{t \sin 3t\}$	7M	CO1	L2
b)	Find the L.T of $L\{t\, e^{-2t} \cos t\}$	7M	CO1	L1
	OR			
2. a)	Find $L\left\{\int_0^t \int_0^t \cosh at \, dt \, dt\right\}$	7M	CO1	L1
b)	Using L.T, Evaluate $\int_0^\infty te^{-t} \sin t \, dt$	7M	CO1	L3
	UNIT–II			
3. a)	Find the inverse L.T of $\log\left(\frac{s^2+4}{s^2+9}\right)$	7M	CO2	L1
b)	Find $L^{-1}\left\{\log\left(\frac{s+a}{s+b}\right)\right\}$	7M	CO2	L1
	OR			
4.	Using L.T, solve $\left(D^2+4D+5\right)y = 5$, given that $Y(0)=0, Y'(0)=0$	14M	CO2	L3
	UNIT–III			
5.	Expand $f(x) = x^2,\ 0 < x < 2®$ as a Fourier series.	14M	CO3	L2
	OR			
6.	Find the Fourier Series of periodicity 3 for $f(x) = 2x - x^2$ in $0 < x < 3$	14M	CO3	L1

UNIT–IV

7. Use separation of variables to solve $\frac{\partial^2 u}{\partial x \partial t} = e^{-t}\cos x$, given that $u = 0$ when $t = 0$ and $\frac{\partial u}{\partial t} = 0$ when $x = 0$. 14M CO4 L3

OR

8. A tightly stretched string with fixed end points $x = 0 \quad and \quad x = l$ is initially in a position given by $y(x,0) = y_0 \sin^3\left(\frac{® x}{l}\right)$. If it is released from rest from this position, Find the displacement y at any time and at any distance from the end $x = 0$. 14M CO4 L3

UNIT–V

9. Prove that z^n (n is a positive integer) is analytic and hence find its derivative. 14M CO5 L5

OR

10. a) Evaluate $\int_c \frac{\log z}{(z-1)^3} dz \quad where \quad c : |z-1| = \frac{1}{2}$. Using Cauchy's integral formula. 7M CO5 L5

b) Evaluate $\int_c \frac{dz}{z^3(z+4)}$ where $C \ \ is \ |z| = 2$ using Cauchy's integral formula. 7M CO5 L5

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Hall Ticket Number :										

R-19

Code: 19A234T

II B.Tech. I Semester Supplementary Examinations November 2023

Switching Theory and Logic Design

(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
		UNIT–I	
1.	a)	Distinguish between weighted and non-weighted codes with examples.	6M
	b)	Represent the Decimal number 9510 in i) BCD ii) Excess 3 iii) Gray Codes.	8M
		OR	
2.	a)	What are Universal gates? Realize AND and OR gates using NOR gates.	7M
	b)	State duality theorem. List Boolean laws and their duals.	7M
		UNIT–II	
3.	a)	What is the difference between canonical form and standard form? Which form is preferable while implementing a Boolean function with gates?	7M
	b)	Implement EX-NOR Gate using only NAND Gates.	7M
		OR	
4.	a)	Define prime implicant and essential prime implicant with example using K-map.	7M
	b)	Find all the prime implicants for the following Boolean function using K-map and determine which are essential? F(A,B,C,D) = Σm(1,3,4,5,9,10,11,12,13,14,15)	7M
		UNIT–III	
5.	a)	What is programmable logic array? How it differs from PROM.	7M
	b)	Implement full adder circuit using 3X8 Decoder.	7M
		OR	
6.	a)	What is magnitude comparator? Explain with circuit diagram a 1 bit magnitude comparator.	7M
	b)	Design BCD to Excess 3 code converter and realize using logic gates.	7M
		UNIT–IV	
7.	a)	Differentiate between positive edge triggered and negative edge triggered flip- flops	7M
	b)	Draw the logic symbols and truth tables of JK and T flip flop	7M
		OR	
8.	a)	Explain the operation of twisted ring counter with the help of logic diagram and its timing diagrams.	7M
	b)	Explain the operation of D Flip-Flop.	7M
		UNIT–V	
9.	a)	Discuss mealy and Moore machine models of sequential machines.	7M
	b)	Explain the salient features of ASM chart.	7M
		OR	
10.	a)	Explain the minimization procedure for determining the set of a completely specified sequential machine.	7M
	b)	What are the rules to convert Mealy to Moore model?	7M

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Hall Ticket Number :										

R-19

Code: 19A231T

II B.Tech. I Semester Supplementary Examinations November 2023

Analog Electronics

(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.		Derive the expression to obtain feedback input resistance, voltage gain and output resistance for a current shunt feedback amplifier with neat sketches.	14M	CO1	L2
		OR			
2.		With neat sketch explain the working principle of RC phase shift Oscillator and derive the expression to find the frequency of oscillation.	14M	CO1	L2
		UNIT–II			
3.		Explain the operation of instrumentation amplifier with relevant diagrams.	14M	CO2	L2
		OR			
4.	a)	Illustrate the DC characteristics of an OP amp	9M	CO2	L2
	b)	Discuss the ideal characteristics of ideal op-amp.	5M	CO2	L1
		UNIT–III			
5.		Discuss the working of half wave and full wave precision rectifier with relevant sketch	14M	CO3	L2
		OR			
6.		Explain the working of Schmitt trigger circuit using Op-amp with necessary diagrams	14M	CO3	L2
		UNIT–IV			
7.		With a neat sketch explain the working principle of Voltage Controlled Oscilloscope.	14M	CO4	L2
		OR			
8.		Discuss any three application of Astable Multivibrator using IC555 timer.	14M	CO4	L2
		UNIT–V			
9.		Explain the working principle of Successive approximation ADC with a neat diagram	14M	CO5	L2
		OR			
10.		Draw and explain the block diagram application of A/D and D/A converter.	14M	CO5	L2

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Hall Ticket Number :										

R-19

Code: 19A232T

II B.Tech. I Semester Supplementary Examinations November 2023

Circuit Theory

(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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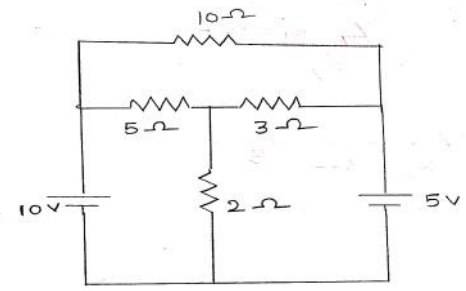
		Marks	CO	BL

UNIT–I

1. Calculate node voltages using Nodal analysis.

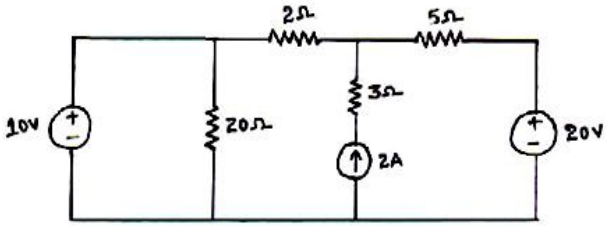


14M 1 3

OR

2. a) Recall the Voltage-Current relationship for Resistor, Inductor and Capacitor. 7M 1 1

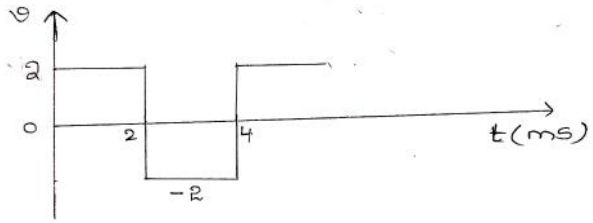
b) Apply Mesh analysis and find the loop currents.



7M 1 4

UNIT–II

3. a) Determine the Average, RMS, Peak and Form Factor for the following waveform.

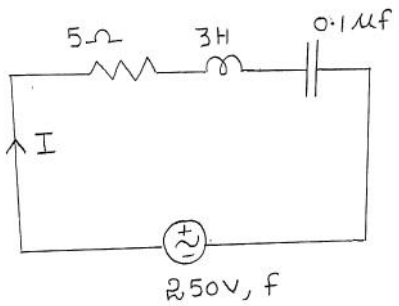


7M 2 3

b) List out different types of AC waveforms. 7M 2 1

OR

4. a) Calculate the i) resonating frequency ii) current at the resonance iii) band-width iv) quality factor for the series RLC circuit.



14M 2 3

UNIT–III

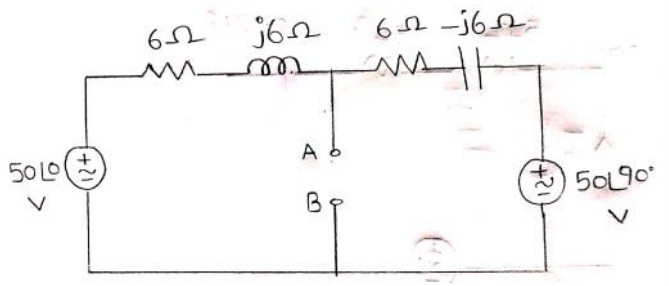
5. A Delta connected load of $Z_R = 10\angle -60$; $Z_Y = 5\angle 30$ and $Z_B = 10\angle -90$ is receiving power from a 3-phase, 3-wire 400 V, RBY system. Find the phase voltages, phase currents and line currents. 14M 3 3

OR

6. Determine the relationship between line currents and phase currents for a balanced 3-Ø delta connected system with suitable diagrams. 14M 3 3

UNIT–IV

7. a) Calculate the impedance to be connected across A&B to get the maximum power to it and also find the maximum power.



8M 4 3

b) Explain substitution theorem with an example. 6M 4 2

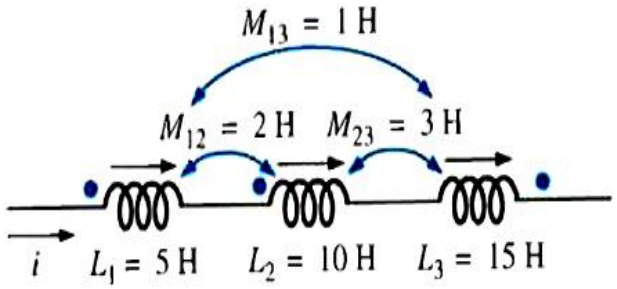
OR

8. a) Explain Thevenin's theorem with an example 7M 4 2

b) Explain Nortorn's theorem with an example 7M 4 2

UNIT–V

9. a) Calculate the net inductance.

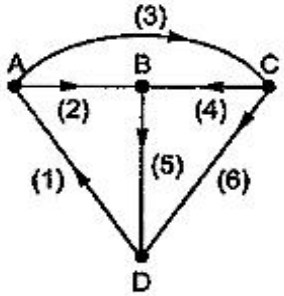


8M 5 3

b) Determine the expression for equivalent inductance of two coupled coils connected in series opposing with mutual inductance. 6M 5 3

OR

10. Develop the fundamental Tie-set matrix for the following graph.



14M 6 3

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