



Gayatri Vidya Parishad College of Engineering for Women (Autonomous)

Madhurawada, Visakhapatnam

Department of Electrical and Electronics Engineering I B.Tech II Semester – Regular Examinations, Jun -2025 Electrical Circuit - 1

SCHEME OF VALUATION

Q.No	Question
1.a)	Loop equation -1 ----->2M Loop equation -2----->2M Loop equation -3 ----->2M $I_1 = 3.3 \text{ A}$ ----->1M
1.b)	Node equation -1 ----->2M Node equation -2----->2M $V_1 = 6.44 \text{ V}$ ----->1M $V_2 = 8.889 \text{ V}$ ----->1M $V_{4 \text{ ohm}} = 7.11 \text{ V}$ ----->1M
2.a)	Delta – Star conversion $R = 10/3 \text{ ohm}$ ----->2M Equivalent circuit after conversion ----->2M Equivalent after series / parallel reduction ----->2M Equivalent resistance $R_{eq} = 13.87 \text{ ohm}$ ----->2M
2.b)	Node equation -1 ----->2M Node equation -2----->2M Node equation -3----->1M $V_1 = 8.063 \text{ V}$, $V_2 = 10.2 \text{ V}$, $V_3 = 3.06 \text{ V}$ ----->2M
3. a)	Voltage Equation (V) = $5 \sin(\omega t)$ ----->2M Time period (T) = π ----->1M Average Value (V_{avg}) = $10/\pi \text{ V}$ ----->2M RMS value (V_{RMS}) = 3.535 V ----->2M
3.b)	Circuit Diagram ----->1M Branch currents $I_1 = 7.66 \angle -45^\circ \text{ A}$ & $I_2 = 5.11 \angle -30^\circ \text{ A}$ ----->2M Total current (I) = $12.66 \angle -39^\circ \text{ A}$ ----->2M Power factor = 0.777 ----->2M
4.a)	Average value ----->2M RMS value ----->2M Form Factor ----->2M Peak Factor ----->1M
4.b)	Current = $23 \angle -36.86^\circ \text{ A}$ ----->2M Power factor = 0.8 lag ----->2M Reactive power = 3173.2688 VAR ----->1M Total volt- amp = $5290 \angle -36.86^\circ$ ----->2M
5.a)	Current due to 200 V source $I_1 = 1.65 \text{ A}$ ----->3M Current due to 20 A source $I_1 = 9.58 \text{ A}$ ----->3M Current in 23 ohm resistance = 11.232 A ----->1M
5.b)	Compensation Theorem statement ----->3M Compensation Voltage calculation ----->1M Procedure to apply compensation theorem with example----->3M
6.a)	V_{TH} calculation = 0.9527 V ----->3M R_{TH} Calculation = 23.8 ohm ----->2M Thevenin's equivalent and current in 50 ohm = 0.0129 A ----->2M
6.b)	Maximum power transfer Theorem statement ----->3M Current equation ----->1M Power Equation ----->1M Condition for maximum power transfer ----->2M

7.a)	Resonance Frequency derivation ----->3M Impedance at resonance $Z_{min} = R$ ----->2M Current at resonance $I_{max} = V/R$ ----->2M
7.b)	Current Expression ----->2M Current locus diagram ----->2M Circle equation ----->3M
8.a)	Resonance frequency (F_r) definition ----->2M Bandwidth (BW) definition ----->2M Quality factor (Q) definition ----->2M $F_r = BW * Q$ ----->1M
8.b)	Current Expression ----->3M Current for Various resistance ----->2M Current locus diagram ----->2M
9.a)	Self-inductance $L_1 = 0.028$ H ----->2M Self-inductance $L_2 = 0.226$ H ----->1M Coefficient of coupling $k = 0.625$ ----->2M Mutual Inductance $M = 0.0497$ H ----->2M
9.b)	Tree diagram ----->2M Fundamental loops ----->2M Tie-Set Matrix ----->3M
10. a)	Coefficient of coupling $k = 0.707$ ----->3M Loop equation - 1 ----->2M Loop equation - 2 ----->2M
10.b)	Tree diagram ----->2M Fundamental Cuts ----->2M Cut-Set Matrix ----->3M

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