



R25 Regulation

Subject code:5ESIAG

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech I Semester Regular Examinations, January 2026

ELECTRICAL CIRCUITS – I
(EEE)

Maximum Marks: 60

Date:23.01.2026

Duration: 3 hours

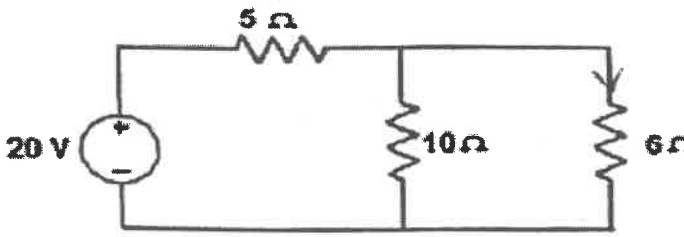
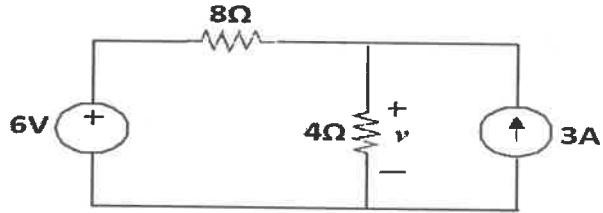
- Note: 1.This question paper contains two parts A and B.
2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (5X2M=10Marks)		Marks	CO	BTL
1.a	Explain an active element with examples.	2M	1	L2
b	Define active power and reactive power.	2M	2	L1
c	Define balanced and unbalanced systems.	2M	3	L1
d	State Superposition theorem.	2M	4	L4
e	Define mutual inductance and self-inductance	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
2	a) Describe independent and dependent sources. b) Find the current in the 3Ω resistor in the network shown below. <div style="text-align: center;"> </div>	5M 5M	1	L2 L3
OR				
3	a) State and explain Kirchoff's laws. b) Explain the steps involved in mesh current analysis with example.	5M 5M	1	L2 L2
4	a) Derive the RMS value and Average Value of a sinusoidal alternating current. b) Explain the steady-state analysis of a series RL circuit.	5M 5M	2	L3 L2
OR				
5	a) Compare series and parallel resonance.	5M	2	L3

	b) An AC circuit has impedance $Z=8+j6 \Omega$ and supply voltage of 100 V. Find:(a) Current (b) Active power (c) Reactive power (d)power factor	5M		L3
6	Derive the relationship between phase and line voltages in three-phase star connected balanced systems $V_L=\sqrt{3}V_{ph}$.	10M	3	L3
OR				
7	Derive the measurement of power by two wattmeter method.	10M	3	L3
8	a) State and Explain Maximum power transfer theorem. b) Using Norton's theorem. Find the current through branch 6 ohms, in the circuit shown below	5M 5M	4	L2 L3
				
OR				
9	a) State Thevenin's theorem. Describe the procedure to find Thevenin equivalent circuit using suitable example. b) Use the super position theorem to find v in the circuit shown below.	5M 5M	4	L2 L3
				
10	a) Derive an expression for coefficient of coupling. b) Explain the Farad's law of electromagnetic induction.	5M 5M	5	L2 L2
OR				
11	a) Explain the dot convention of two coils are connected in series adding and find equivalent inductance. b) Two coils with coefficient of coupling of 0.6 H between them are connected in series as (i) cumulative coupling (ii) differential coupling. The total inductance in cumulative coupling is 2H and in the differential coupling is 0.5H. if one of the coil self-inductance is 0.2 H. Determine (i) Mutual inductance (ii) self-inductance of other coil.	5M 5M	5	L2 L3