R25 Regulation *Subject code:5ES1AG*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech I Semester Supplementary Examinations, June2026

ELECTRICAL CIRCUITS – I

(EEE)

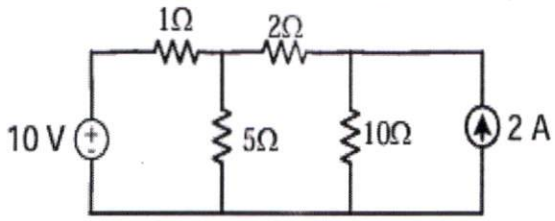
Maximum Marks: 60 Date:27.06.2026 Duration: 3 hours

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	Distinguish between independent and dependent sources.	2M	1	L1
b	What is the form factor of a sine wave?	2M	2	L1
c	State the advantages of a three-phase system over a single-phase system.	2M	3	L2
d	How are voltage and current sources treated while applying superposition theorem?	2M	4	L2
e	Define self inductance.	2M	5	L2

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
2	a) Explain about passive and active elements with examples. b) Determine the voltage across the 5Ω resistor by nodal analysis. 	5M 5M	1	L2 L3
	OR			
3	Derive the expression for star to delta and delta to star transformation.	10M	1	L2
4	Derive the expression for series RL circuit.	10M	2	L2
	OR			
5	a) Derive the expression for bandwidth of a series resonant circuit. b) A series RLC circuit has R = 10 Ω, L = 0.2 H, C = 50 μF. Find: (a) Resonant frequency (b) Impedance at resonance (c) Current at resonance.	5M 5M	2	L3

6	a) Prove that the line voltage is $\sqrt{3}$ times the phase voltage in three phase star connected balanced system. b) A three-phase balanced delta connected load of (9+j2) ohm is connected across a 400V, 3ϕ balanced supply. Determine the phase currents and line currents. Assume the phase of sequence to be RYB. Also calculate the power drawn by load.	5M 5M	3	L2 L3
	OR			
7	a) Explain the two-wattmeter method of measuring three-phase power. b) Three coils each having of 10Ω and Inductance of 0.02H are connected in star across 440V,50HZ,3-Phase Supply. Calculate the line current, Phase current and total power.	5M 5M	3	L2 L3
8	State and explain Thevenin's theorem for DC excitation with an example.	10M	4	L3
	OR			
9	a) State and explain the Reciprocity theorem with an illustrative example. b) State and Explain Millman's theorem.	5M 5M	4	L2 L2
10	A) Derive the expression for coefficient of coupling in the magnetic circuit. B) Compare series and parallel magnetic circuits.	5M 5M	5	L2 L3
	OR			
11	a) Explain the dot convention used in magnetically coupled circuits with neat diagrams. b) Derive an expression for equivalent inductance of two coils connected in (i). series aiding and (ii) series opposing.	5M 5M	5	L2 L3