



R22 Regulation

Subject code:4E1AE

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech I Semester Supplementary Examinations, January 2026

ELECTRICAL CIRCUITS

(EEE)

Maximum Marks: 60

Date: 09.01.2026

Duration: 3 hours

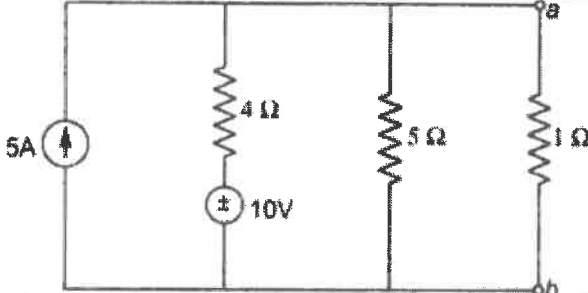
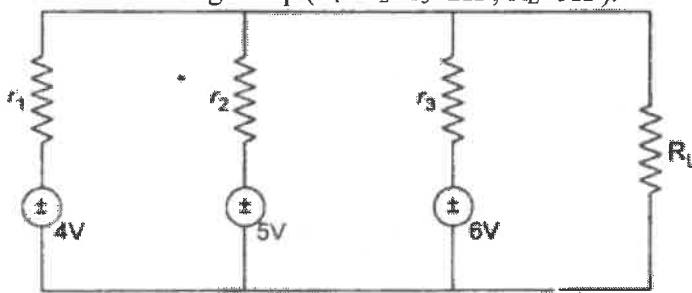
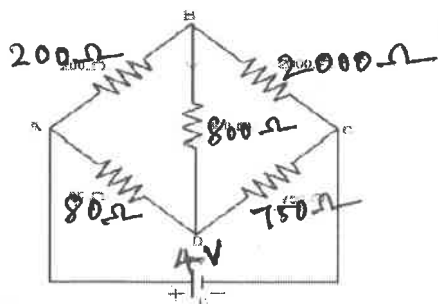
- Note: 1. This question paper contains two parts A and B.
 2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
 3. Part B consists of 5 Units. Answer any one full question from each unit.
 4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X1M=10 Marks)		Marks	CO	BTL
1.a	What are Unilateral and Bilateral elements.	1M	1	L1
b	Write the difference between a circuit and a network.	1M	1	L1
c	Define RMS.	1M	2	L1
d	Define Resonance and Resonant frequency.	1M	2	L1
e	Write the statement of thevenin's theorem.	1M	3	L1
f	Write the statement of Norton's theorem.	1M	3	L1
g	What is the phase sequence of the 3-phase system	1M	4	L1
h	In the balanced 3-phase voltage system generated by a star connected alternator, V_{YB} lags E_R by which angle.	1M	4	L1
i	Define self-Inductance.	1M	5	L1
j	Define connected and unconnected graph?	1M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
2	Derive the voltage,current,power and energy equations for Resistor,Inductor and Capacitor .	10M	1	L2
OR				
3	Derive the expression for star to delta and delta to star transformation?	10M	1	L2
4	Explain about alternating current through RL series circuit. And also derive the power and power triangle.	10M	2	L2
OR				
5	Explain briefly about series and parallel Resonance.	10M	2	L2
6	Find power loss in 1Ω resistor by Thevenin's theorem.	10M	3	L2

				
	OR			
7	<p>Using Milliman's theorem calculate the current through R_L in the circuit, and find the voltage drop. ($r_1 = r_2 = r_3 = 2\Omega$, $R_L = 5\Omega$).</p> 	10M	3	L2
8	<p>A three phase balanced delta connected load of $(10+j8)$ ohm is connected across a 400V, 3-ϕ balanced supply. Determine the phase currents and line currents. Assume phase sequence to be RYB. Also calculate the power drawn by the load.</p>	10M	4	L2
	OR			
9	<p>Derive the relation between the line and phase quantities in star connection system for a balanced star connected load.</p>	10M	4	L2
10	<p>Two coupled coils with $L_1 = 0.02H$ and $L_2 = 0.01H$ and $k = 0.5$ are connected in series aiding, series opposing, parallel adding and parallel opposing. What are the four equivalent inductances</p>	10M	5	L2
	OR			
11	<p>Derive cutset matrix for the given circuit</p> 	10M	5	L2