R22 Regulation *Subject code: 4E1AE*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech I Semester Supplementary Examinations, June 2024
Electrical Circuits

(EEE)

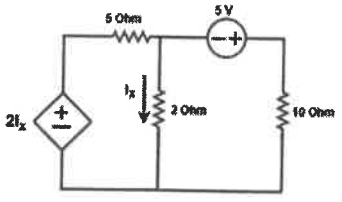
Maximum Marks: 60 Date:27.06.2024 Duration: 3 hours

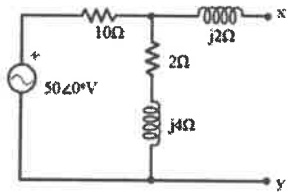
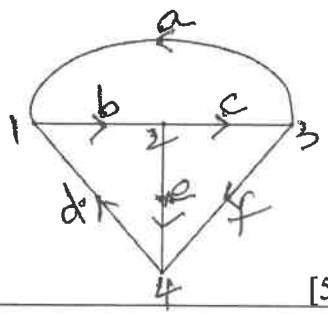
Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X1M=10 Marks)			CO	Bloom Tx
1.	a	Differentiate ideal and practical sources.	1	BL1
	b	Two inductors with inductances of 3H and 6H are connected in parallel. Determine the equivalent inductance.	1	BL3
	c	A sinusoidal source is represented by v(t)=300sin314t.Determine the peak value and frequency of the waveform.	2	BL3
	d	Define Frequency.	2	BL4
	e	Write the statement of reciprocity theorem.	3	
	f	State the superposition theorem.	3	BL3
	g	Write the relationship between line voltage and phase voltage and line current and phase current in a balanced star connected system.	4	BL2
	h	Define Active power	4	BL4
	i	Define co-tree.	5	BL1
	j	Define self-inductance.	5	BL1

Part-B

Answer All the following questions. (5X10M=50Marks)				
2		a) Explain about active and passive elements. [5] b) Explain about Kirchhoff current and voltage law. [5]	1	BL3
		OR		
3		Determine ix in the circuit shown below. [10] 	1	BL2
4		A. Determine the form factor and RMS value of sinusoidal voltage.	2	BL4

	B. A series RLC circuit with R=20Ω,L=0.H and C = 100μF is excited by single phase 230V,50Hz ac source. Determine (i)Impedance of the circuit (ii) Current (iii) Power (iv)Power factor of the load [5+5]		
	OR		
5	Define Resonance and find the Resonance frequency of series RLC circuit[10]	2	BL1
6	State and explain the Nortons theorem with a suitable example. [10]	3	BL2
	OR		
7	A. State and explain Superposition theorem. B. Determine the Thevenin's equivalent circuit across the terminals X-Y in the circuit shown below.  [5+5]	3	BL4
8	Prove that two watt meters are sufficient to measure the total 3-phase active power in a 3-phase circuit. Derive an expression for power factor in terms of wattmeter readings. [10]	4	BL2
	OR		
9	A. Derive the relationship between line and and phase quantities of current and voltage in a balanced delta connected system. B.A three-phase 415V,50Hz source is supplying power to a balanced three-phase delta connected load of 8+j6 Ω. Determine the line current power and power factor of the load. [5+5]	4	BL4
10	What is dot convention. Explain the self-inductance and mutual inductance [10]	5	BL3
	OR		
11	A. Define Graph, tree and Branch. B. Determine the cut-set matrix for the graph shown in figure.Consider the branch of tree as b,c and e.  [5+5]	5	BL4