

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-III(NEW) EXAMINATION – SUMMER 2023****Subject Code:3131103****Date:01-08-2023****Subject Name:Network Theory****Time:02:30 PM TO 05:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

		MARKS
Q.1	(a) Explain Ideal and Practical Current and Voltage sources with their characteristics and differentiate them with respect to ideality and practice.	03
	(b) Briefly describe active, passive, lumped and distributed elements.	04
	(c) In the network of Fig-1, the switch k is closed at t=0 and the circuit was in steady state before. Determine particular solution of current i.	07
Q.2	(a) State the possible types of controlled sources and draw their symbols.	03
	(b) Define: Tree, Connected Graph, Co-tree, Sub-graph.	04
	(c) Determine current through 4 Ω resistor using mesh analysis for network of Fig-2.	07
OR		
	(c) State and explain maximum power transfer theorem with necessary derivation.	07
Q.3	(a) Explain Initial and final conditions of R, L and C elements.	03
	(b) Discuss rules for source transformation.	04
	(c) For the network of Fig-3, obtain current through 1 Ω resistor using Thevenin's theorem.	07
OR		
Q.3	(a) Define time constant and state its importance in circuit analysis.	03
	(b) State and explain Norton's theorem with an example.	04
	(c) Determine voltage across 6Ω resistor of Fig-4 using node analysis.	07
Q.4	(a) Explain dot convention for coupled coils with suitable example.	03
	(b) Give statements for Reciprocity Theorem and Superposition Theorem.	04
	(c) Find values of $i, \frac{di}{dt}, \frac{d^2i}{dt^2}$ at t=0+ . for the network of Fig-5, if switch k is changed from position 1 to 2 at t=0.	07
OR		
Q.4	(a) Derive ABCD parameters in terms of z-parameters.	03
	(b) Determine h-parameters in terms of y-parameters.	04
	(c) Derive relationship between incidence matrix, fundamental tie-set matrix and fundamental cut-set matrix.	07
Q.5	(a) Define: oriented graph, node, tie-set matrix.	03
	(b) Determine h-parameters in terms of z-parameters.	04
	(c) Determine h parameters for network of Fig-6	07

OR

- Q.5 (a) Define: Incident Matrix, cut-set, graph. 03
 (b) Briefly explain PRF. 04
 (c) Derive the condition for the network to be symmetrical for g-parameters. 07

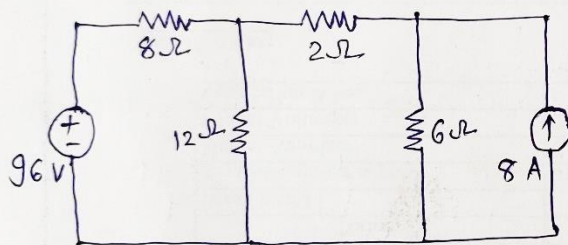
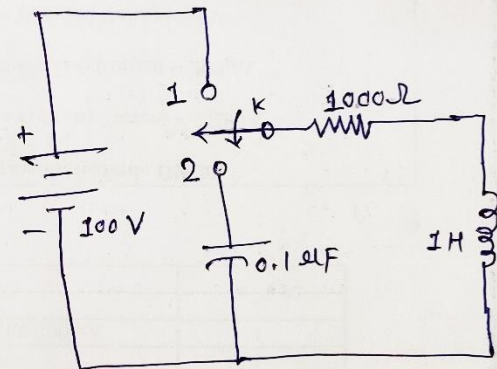
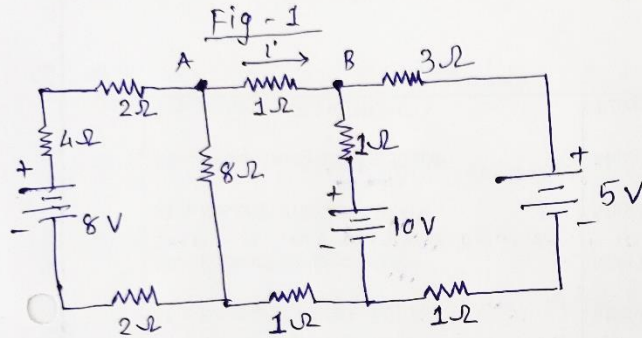
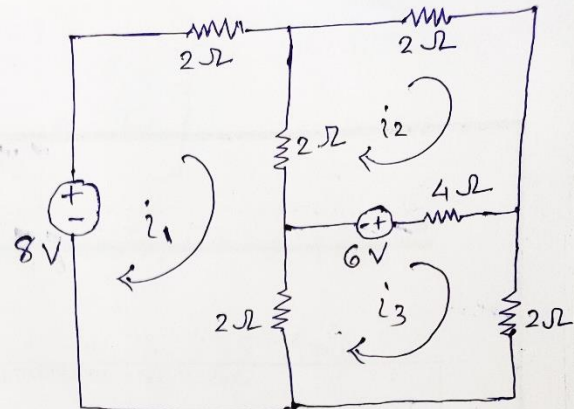
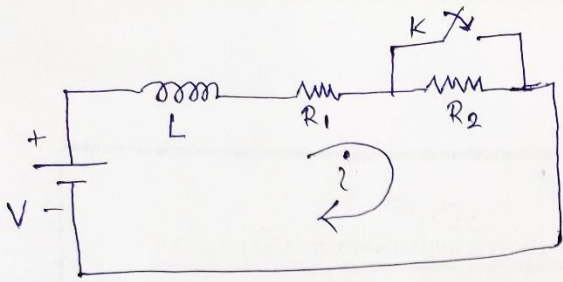


Fig-4

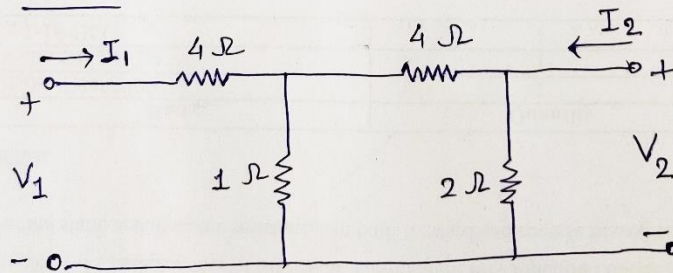


Fig-6
