

Seat No.: _____

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER- III EXAMINATION – SUMMER 2020****Subject Code: 3131707****Date: 04/11/2020****Subject Name: Network Analysis****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.

		Marks
Q.1	(a) Define following terms: (a) Linear and Nonlinear Networks (b) Unilateral and Bilateral Networks.	03
	(b) Define following terms: (a) Time-Invariance and Time variance Networks. (b) Active and Passive Networks with example.	04
	(c) Explain ideal, practical and dependent voltage and current sources with all necessary diagrams.	07
Q.2	(a) Determine the inductance between the terminals for a three coil shown in fig 1	03
	(b) For the network shown in the fig 2, determine the numerical value of the branch current i_1 using sources transformation theorem.	04
	(c) Determine the node voltages V_1 , V_2 and V_3 in a network of fig 3, using nodal analysis.	07
	OR	
	(c) Find the current I_1 , I_2 , I_3 and I_4 for the network shown in fig 4, using mesh analysis	07
Q.3	(a) State and explain Reciprocity theorem with example.	03
	(b) Determine current i in a circuit shown in fig 5, using Super position theorem.	04
	(c) Find the Norton's equivalent circuit across the terminal AB of the network shown in fig 6.	07
	OR	
Q.3	(a) State and explain maximum power transfer theorem. Derive the condition for maximum power transfer to Resistive load for DC circuit	03
	(b) State and explain Millman's theorem with proof.	04
	(c) Find the current in 6 ohm resistor in the network shown in fig 7, using Thevenin's theorem	07
Q.4	(a) Write the initial conditions in the inductor and capacitor at $t = 0^+$ and $t = \infty$.	03
	(b) Find out the values of V , dV/dT and d^2V/dT^2 just after switching (at time $t = 0^+$) in the circuit shown in fig 8.	04
	(c) For the circuit shown in the fig 9, the switch 'S' is at position '1' and the steady state condition is reached. The switch is moved to position '2' at $t = 0$. Find the current $i(t)$ in both the cases, i.e. switch at position 1 and switch is at position 2	07
	OR	
Q.4	(a) Write equations of Short circuit Admittance and Open Circuit Impedance parameters of a two port network.	03
	(b) Derive the relationship between h-parameters and ABCD parameters	04
	(c) Find Z parameters for the network of fig 10.	07

- Q.5 (a) State and explain final value theorem with proof. 03
 (b) Explain and derive the step response to R-L series circuit using Laplace Transformation method. (Fig 14.) 04
 (c) In the network of fig 11, if the switch has remained in position A for a long time and then moves to position B at $t = 0$. Find $v_c(t)$ for $t \geq 0$ for $R_2 = 405 \text{ ohm}$. (405Ω resistor is shown in fig.11) 07

OR

- Q.5 (a) Define following terms: (a) Oriented graph (b) Co-tree. c) Cut-set 03
 (b) How many trees are possible for the graph of the network of fig 12. 04
 (c) For the network shown in fig 13, draw the oriented graph and write i) the Incidence matrix, ii) Tieset matrix, and iii) f-Cutset matrix. 07

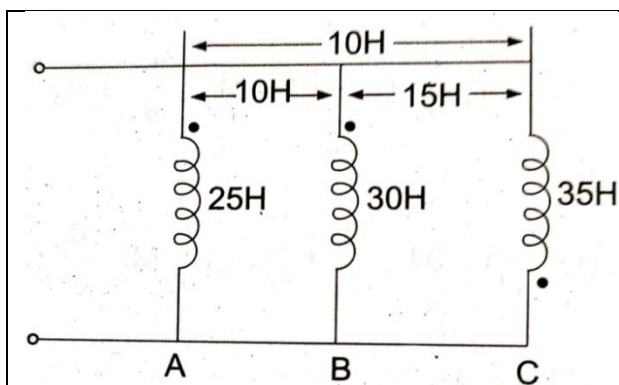


Fig 1.

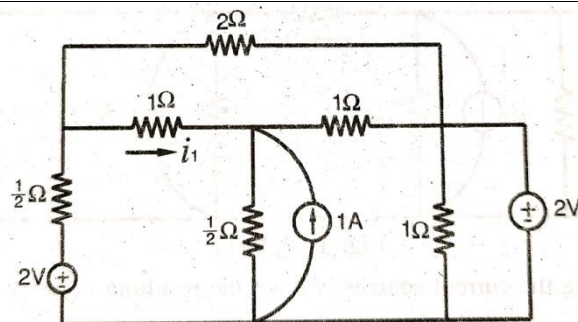


Fig 2.

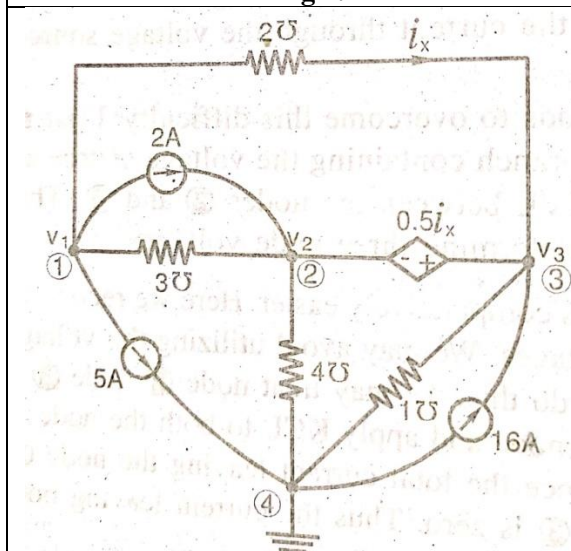


Fig 3.

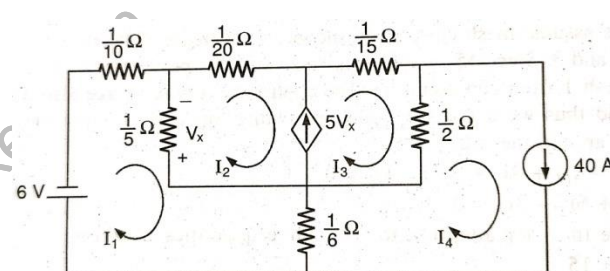


Fig 4.

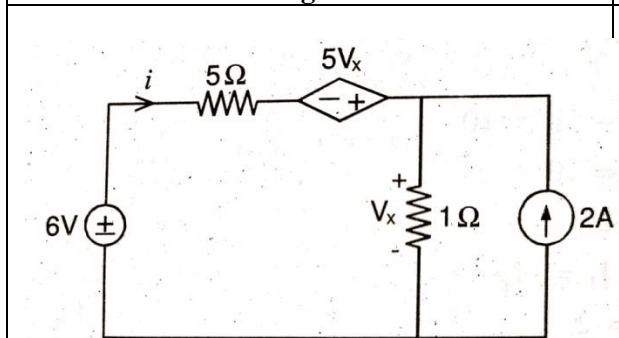


Fig 5.

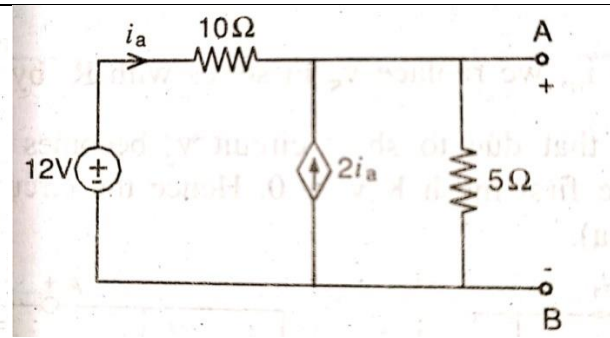


Fig 6.

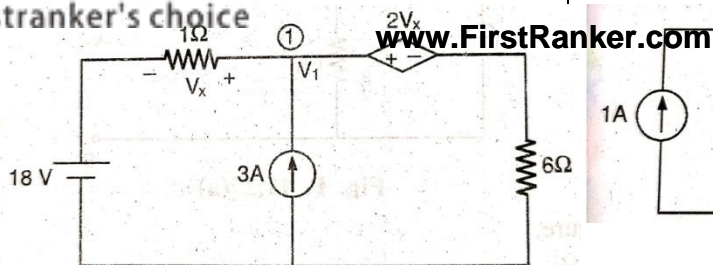


Fig 7.

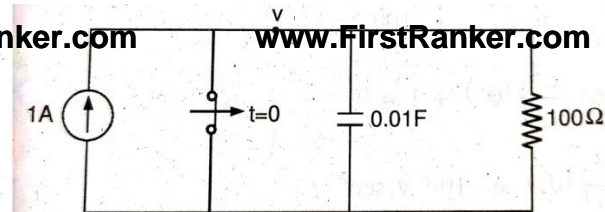


Fig 8.

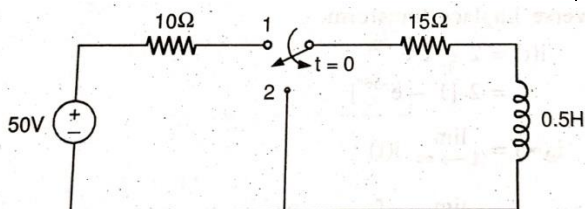


Fig 9.

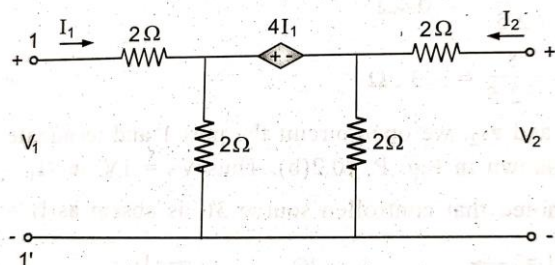


Fig 10.

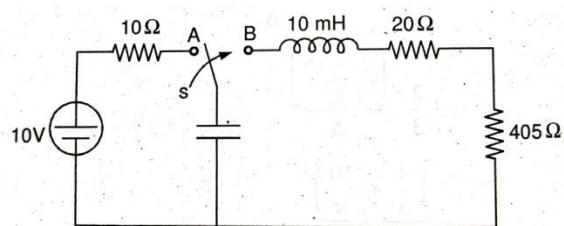


Fig 11.

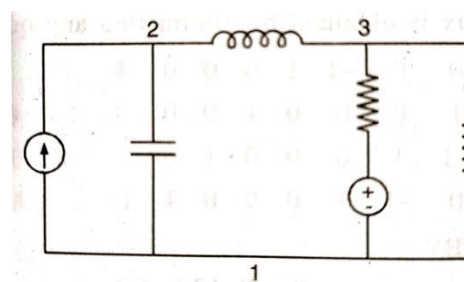


Fig 12.

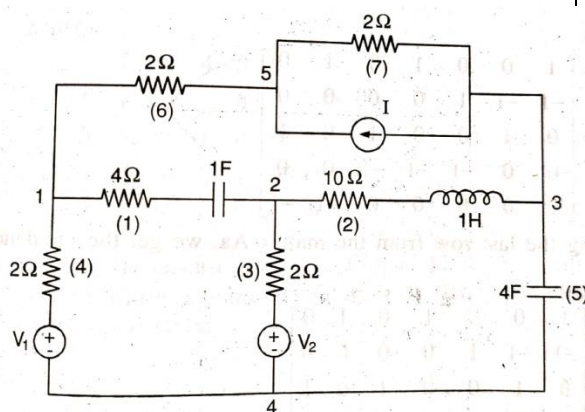


Fig 13.

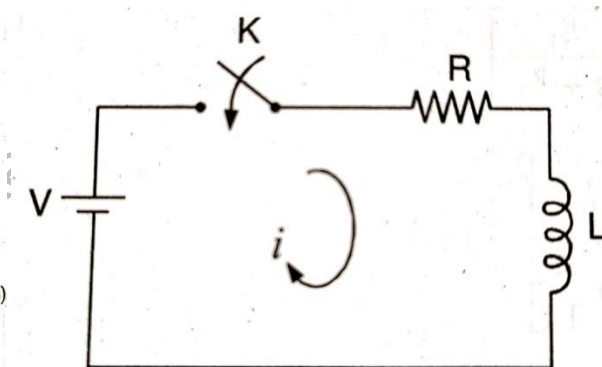


Fig 14.
