

Seat No.: \_\_\_\_\_

Enrolment No. \_\_\_\_\_

## GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– III(OLD) EXAMINATION – SUMMER 2019

**Subject Code: 130901**

**Date: 04/06/2019**

**Subject Name: Circuits And Networks**

**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.

- Q.1** (a) Define following terms: (a) Linear and Nonlinear Networks (b) Lumped and Distributed Networks (c) Principle of Duality **07**  
(b) Construct the exact dual of the network of figure.1. **07**
- Q.2** (a) State Thevenin's theorem. Calculate current passing through  $4\Omega$  resistance in the circuit shown in figure.2, using Thevenin's theorem. **07**  
(b) For the circuit shown in figure.3 find the loop currents using mesh analysis. **07**
- OR**
- (b) Find the current passing through  $3\Omega$  resistor for the circuit shown in fig.4 using nodal analysis. **07**
- Q.3** (a) State and explain Millman's theorem. **07**  
(b) Derive the expression for rise of current and decay of current in R-L series circuit excited by d.c. voltage source. **07**
- OR**
- Q.3** (a) State and explain Superposition theorem. **07**  
(b) Find current in  $20\Omega$  resistance in the circuit shown in figure. 5 using superposition theorem. **07**
- Q.4** (a) State and explain the Maximum Power Transfer Theorem. Drive the condition for maximum power transfer to the load for DC and AC circuit. **07**  
(b) Find the current in  $6\Omega$  using Norton's Theorem for the circuit shown in fig. 6. **07**
- OR**
- Q.4** (a) Explain and derive the step response to R-L series circuit using Laplace Transformation method. **07**  
(b) Write the initial conditions for the inductor and capacitor at  $t = 0+$  and  $t = \infty$ . **07**
- Q.5** (a) Give relationship between y parameters and h parameters. **07**  
(b) Obtain z parameters for the network shown in figure. 7. **07**

**OR**

**Q.5 (a)** Explain the following terms

07

1. Graph
2. Tree
3. Co-tree

**(b)** Derive relationship between incidence matrix ( $A$ ), fundamental cut-set matrix ( $Q_f$ ) and fundamental tie-set matrix ( $B_f$ ).

07

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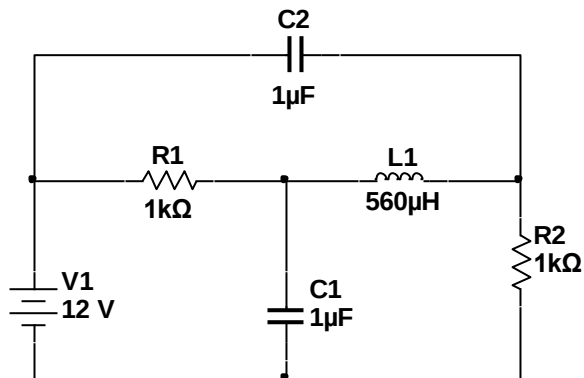


Fig.1

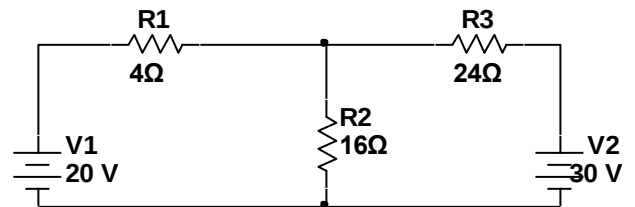


Fig.2

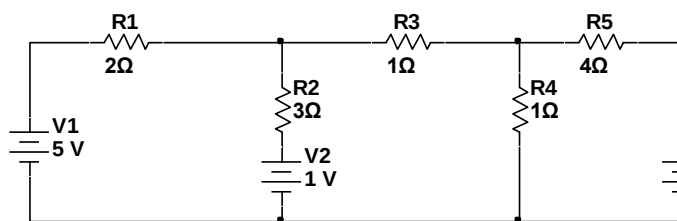


Fig.3

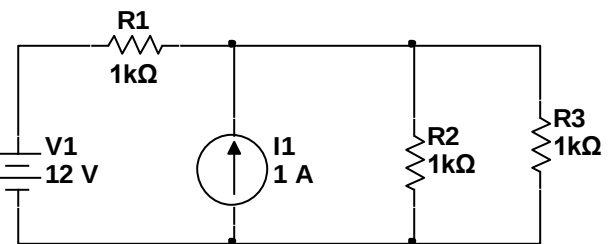


Fig.4

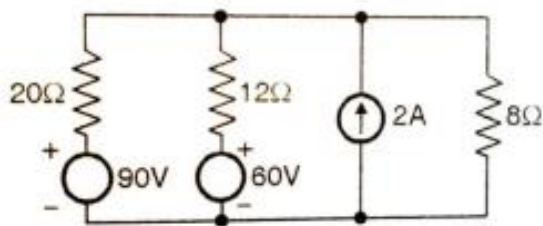


Fig.5

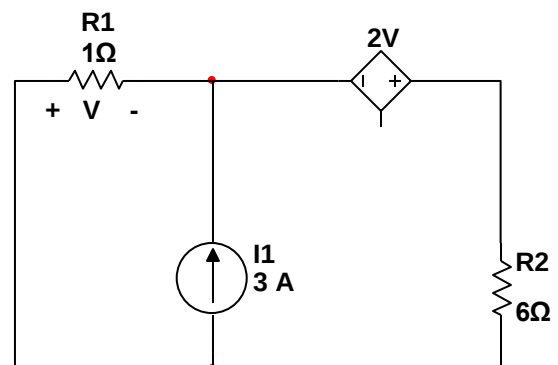


Fig.6

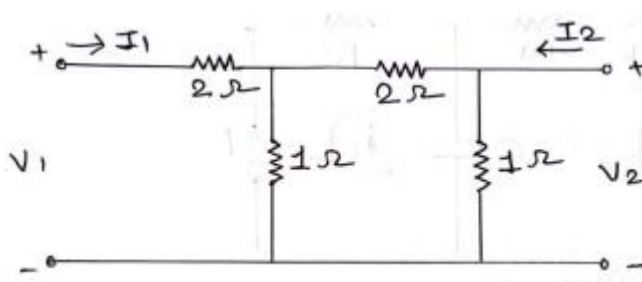


Fig.7