

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-III EXAMINATION – SUMMER 2016

Subject Code:130901

Date:09/06/2016

Subject Name:Circuits and Networks

Time:10:30 AM to 01:00 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)** State the voltage and current relationships in resistor, inductor and capacitor. Also, state the initial and final conditions for resistor, inductor and capacitor for the different conditions. **07**
- (b)** State and explain Maxwell Loop Current (Mesh Analysis) method. **07**
- Q.2 (a)** State and explain Norton's Theorem with suitable example. **07**
- (b)** Describe Laplace transformation method for solving differential equations. State its advantage over the classical method. **07**
- OR**
- (b)** Write down Kirchhoff's voltage law equations for the network in Fig.1. **07**
- Q.3 (a)** State Maximum Power Transfer Theorem. Find the condition for the maximum power transfer for the DC circuit. **07**
- (b)** Find the current through the 5V source in Fig. 2 using Node voltage analysis **07**
- OR**
- Q.3 (a)** State and explain Reciprocity Theorem and Millman Theorem. **07**
- (b)** Find the current through 3k resistance for Fig. 3 using Super Position Theorem. (k stands for kΩ value) **07**
- Q.4 (a)** In the network shown in Fig. 4, find i_1, i_2 and di_2/dt at $t = 0^+$, assuming all initial conditions as zero. **07**
- (b)** Explain the particular integral and complementary function solution of a first order non-homogeneous equation. **07**
- OR**
- Q.4 (a)** In the network shown in Fig. 5, the switch is moved from position 1 to 2 at $t=0$, steady state having previously been attained. Find the voltage $V_c(t)$. **07**
- (b)** Find Laplace transform of $e^{-at}\sin\omega t$. **07**
- Q.5 (a)** Find the expression for z parameters in terms of y parameters. **07**
- (b)** Define the terms: Node, Branch, Loop, Mesh, Graph, Path and Tree. **07**
- OR**
- Q.5 (a)** Explain poles and zeros of network function. Provide features of them. **07**
- (b)** Find the expression for z parameter in terms of ABCD parameters. **07**

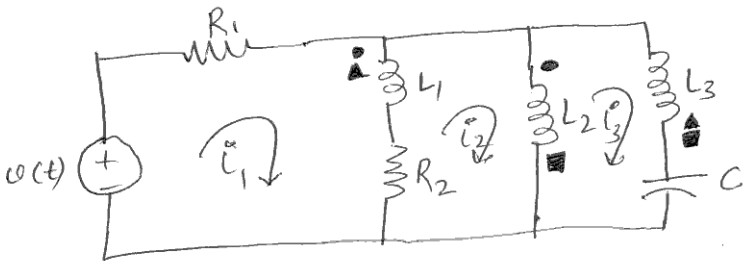


Fig. 1

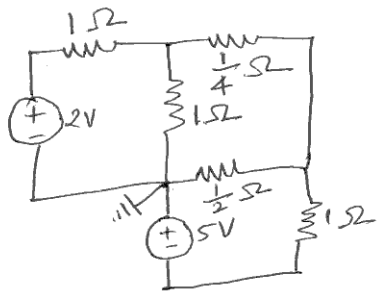


Fig. 2

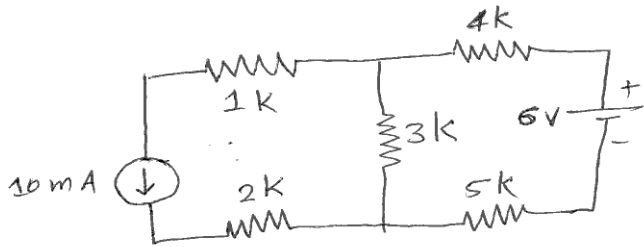


Fig. 3

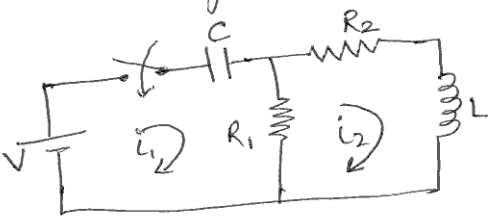


Fig. 4

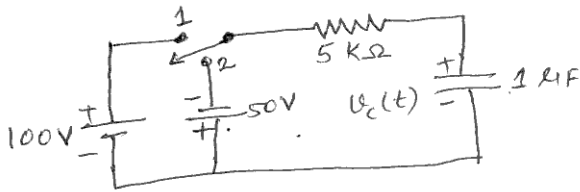


Fig. (5)
