

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-III • EXAMINATION – SUMMER 2013****Subject Code: 130901****Date: 04-06-2013****Subject Name: Circuits and Networks****Time: 02.30 pm - 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:

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- (1) Linear and Nonlinear networks    (2) Lumped and Distributed networks  
 (3) Passive and Active networks        (4) Dependent source

(b) For magnetically coupled network shown in Fig.-1, find dot-convention and Write the KVL equations.

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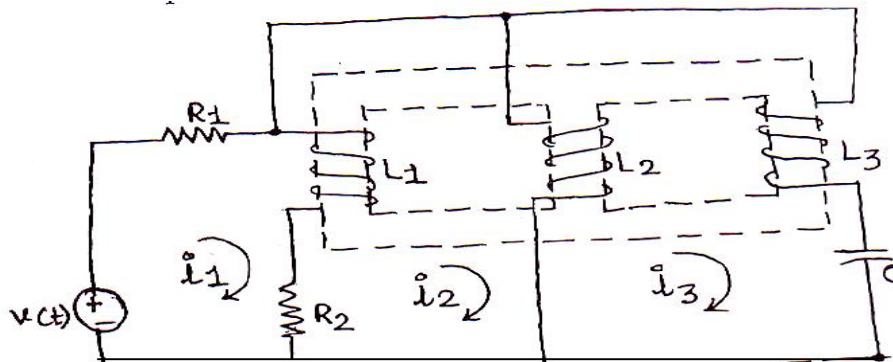


Fig.-1

Q.2 (a) Find currents through the resistors in the network of Fig.-2 using mesh analysis.

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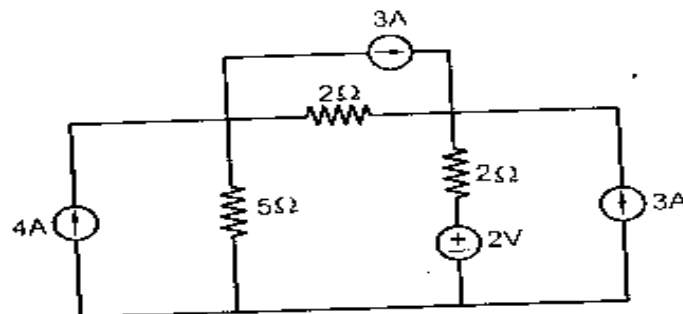


Fig.-2

(b) Determine the current through 2Ω resistor of Fig.3 using source transformation.

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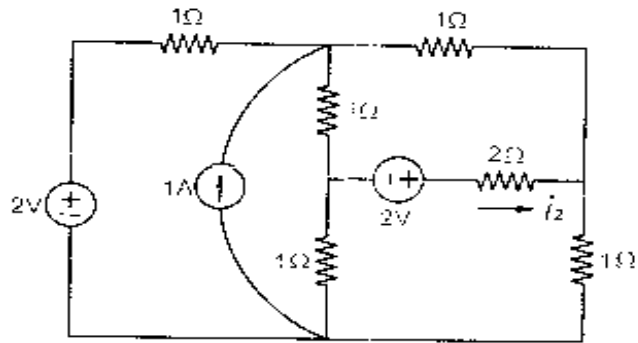


Fig.3

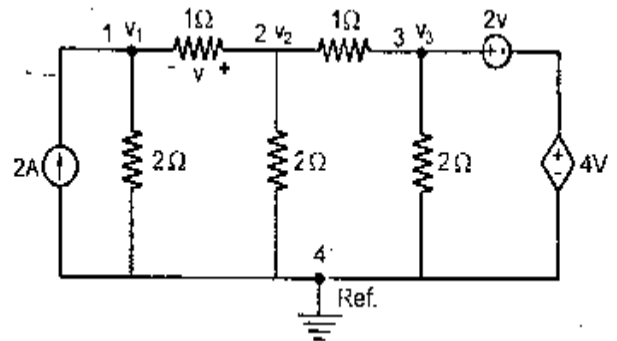


Fig.-4

OR

(b) In the network of Fig.-4 , determine the node voltages  $V_1$ ,  $V_2$  and  $V_3$  using node analysis.

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Q.3 (a) In the network of Fig.-5 the switch K is opened at  $t=0$ . Find the values of  $V$ ,  $dV/dt$  and  $d^2V/dt^2$  at  $t=0+$  if  $I=10A$ ,  $R=10\Omega$  and  $L=1H$ .

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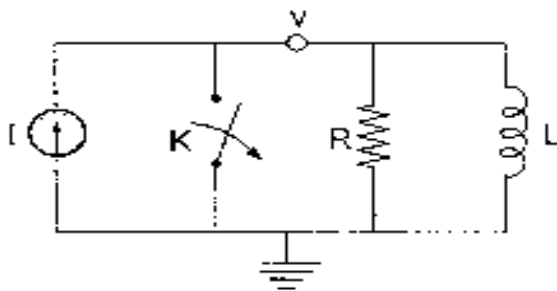


Fig.-5

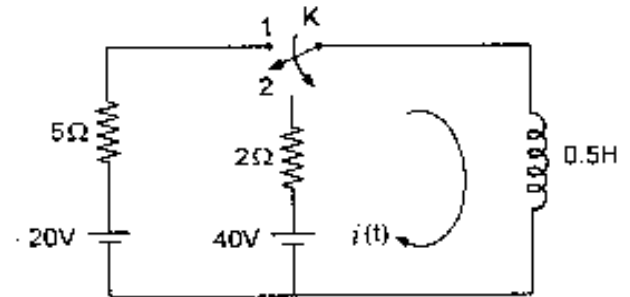


Fig.-6

(b) Derive necessary derivations for source free series R-L-C circuit.

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OR

Q.3 (a) In the network of Fig.-6, the switch K is moved from 1 to 2 position at  $t=0$ , steady state having previously been attained. Determine the current  $i(t)$ .

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(b) In the network of Fig.-7, if the switch has remained in position A for a long time and then moves to position B at  $t=0$ . Find and plot  $V_C(t)$  for  $t \geq 0$  for  $R_2=405\Omega$ .

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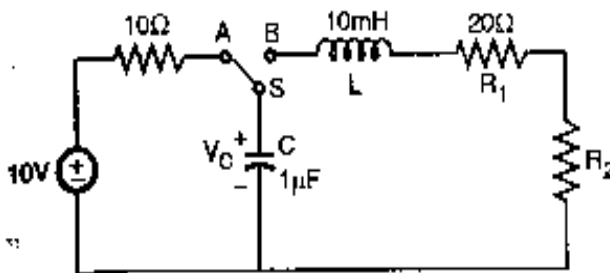


Fig.- 7

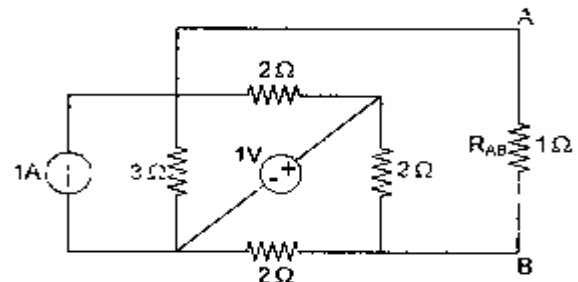


Fig.-8

Q.4 (a) State and explain Norton's theorem.

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