

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**BE - SEMESTER-III • EXAMINATION – SUMMER 2014**

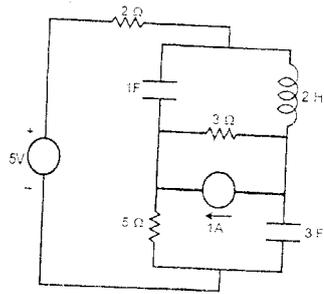
**Subject Code: 130901****Date: 04-06-2014****Subject Name: Circuits and Networks****Time: 02:30 pm to 05:00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

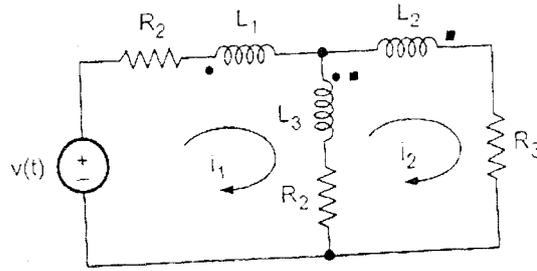
- Q.1** (a) Explain the terms ( i ) Non-Linear (ii) Uni-lateral ( iii) Passive (iv) Reciprocal (v) Time variant (vi) Lumped parameter and (vii) principal of Duality. 07
- (b) Draw dual Network of given Fig.1 07
- Q.2** (a) Explain the “Dot Convention Rule” for the magnetically coupled Network using network shown in Fig.2. Also write KVL equations. 07
- (b) Derive expression of relationship between ‘Y’ parameters and ‘h’ parameters. Discuss Reciprocity and symmetry of network in brief. 07
- OR**
- (b) Explain following in Brief: Ideal and Practical Energy source 07
- Q.3** (a) State and explain Norton’s theorem. 07
- (b) Find out current I in 1 ohm resistor given branch for Fig.3 using superposition theorem 07
- OR**
- Q.3** (a) State and explain maximum power theorem with suitable example 07
- (b) State and explain compensation and Millman theorem 07
- Q.4** (a) In the network of Fig.4, the switch K closed at  $t=0$  Solve for the current  $i(t)$  using Laplace transformation method. 07
- (b) In the Network shown in Fig.5. the switch k is closed at  $t=0$ ,  $V=100$  Volt,  $R=1$  K $\Omega$ ,  $C=0.5$   $\mu$ F,  $L=1$  H sFind (1)  $di/dt$  and (2)  $d^2i/dt^2$  at  $t=0+$  07
- OR**
- Q.4** (a) Find the power supplied by 6 V supply as shown in Fig.-6. 07
- (b) Determine the current through  $2\Omega$  resistor of Fig.7 using source transformation. 07
- Q.5** (a) State and explain the Initial and final value theorem. 07
- (b) What are the procedure for formulation of graph, tree and Incidence Matrix? Hence discuss the procedure of forming reduced Incidence Matrix and its advantages. 07
- OR**
- Q.5** (a) What are the relationship between voltage and current in resistor, inductor and capacitor? Also mention the initial and final condition for R, L and C components in the different cases. 07
- (b) Discuss concept of poles and zeros in a network function. 07

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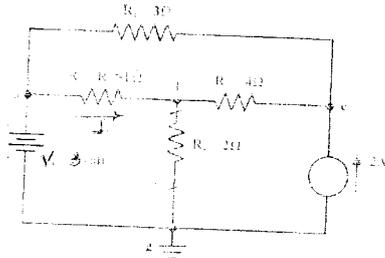
Q-1(B) Fig.1



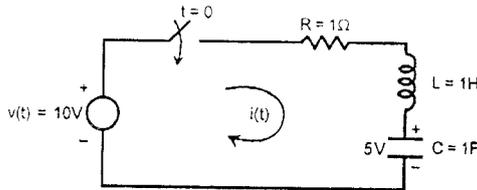
Q-2(a) Fig.2



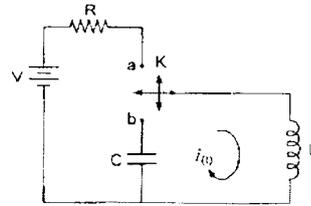
Q-3(B) Fig.3



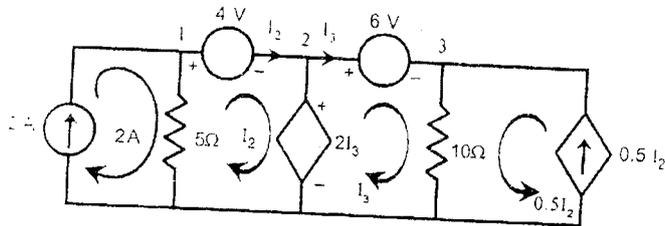
Q-4(A) Fig.4



Q-4(B) Fig.5



Q-4(A) Fig.6



Q-4(B) Fig.7

