

GUJARAT TECHNOLOGICAL UNIVERSITY**BE SEM-III Examination May 2012****Subject code: 130901****Subject Name: Circuits and Networks****Date: 15/05/2012****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) State and Explain the “The Maximum Power Transfer Theorem” .Also derive the condition for maximum power transfer to the load for D.C. and A.C. Circuit. **07**
- (b) Explain the various Two port parameters in brief. Hence derive the expression of ABCD parameters in terms of Z parameters. **07**
- Q.2** (a) Explain the “Dot Convention Rule” for the magnetically coupled Network. Explain the method to put the Dots on different linked Coils using suitable example. **07**
- (b) (1)Formulate the Loop equations for Network shown in fig-1 **07**
(2) Find Voltage drop across x-y for the fig-2
- OR**
- (b) Explain following in Brief: Ideal and Practical Energy source Using the Node Voltage analysis, Find the current in all resistors in fig-3. **07**
- Q.3** (a) Explain following in Brief: Tree, Graph and Link, Active and Passive elements ,Lumped and Distributed parameters, **07**
- (b) For the Network shown in fig-4, Draw the oriented Graph and all possible trees. Also prepare (1)The Incidence Matrix.(2)Tie-set Matrix.(3)F-cut set Matrix. **07**
- OR**
- Q.3** (a) Explain various source transformation techniques. Using Source transformation techniques find current “i1” in the network shown in fig-5.. **07**
- (b) (1) State and Explain in brief: Thevenin’s Theorem **07**
(2) Determine the Inductance between terminal for the 3 coils system shown in fig-6.
- Q.4** (a) (1)Explain: The concept of Duality. **07**
List all analogous quantities used in Duality..
(2) State the Initial and final condition of R,L and C at $t=0+$ and $t=\infty$. (Initially all are uncharged and put across the source).
- (b) In the Network shown in fig-7, a steady state is reached with switch k open with $V=100\text{v}$, $R_1=10\text{ ohm}$, $R_2=R_3=20\text{ ohm}$, $L=1\text{ h}$, $C=1\mu\text{F}$. At time $t=0$ switch k closed. Determine **07**
- (1) voltage across C before switch is closed and its polarity
 - (2) i_1 and i_2 at $t=0+$.
 - (3) $d i_1/dt$ and $d i_2/dt$ at $t=0+$.
 - (4) $d i_1/dt$ at $t=\infty$.

OR

Q.4 (a) State the procedure to obtain the solution of Laplace Transform Technique. State its advantages over classical method. State only Initial and Final value theorem. **07**

(b) In fig-8, i_1 is flowing as shown and switch k is closed at time $t=0$, placing 10 ohm resistor in parallel with series combination of $R=10$ ohm and $L=2$ h. Find the resulting currents. Use Laplace Transform Technique. **07**

Q.5 (a) Explain the Poles and Zeros of the Network function. State its important features and explain its physical significance. **07**

(b) Find the Z parameters of the Network shown in fig-9. Hence derived ABCD parameters from Z parameters. **07**

OR

Q.5 (a) Explain the various types of Interconnections of the Two port networks in brief. **07**

(b) Find the current in the 4 ohm resistor in fig-10 using Thevenin's Theorem and Super position theorem. **07**

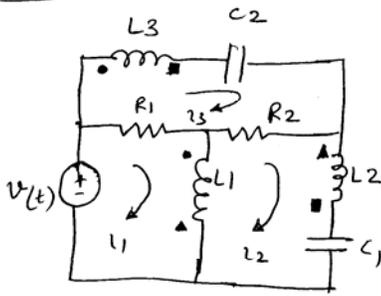


Fig-1

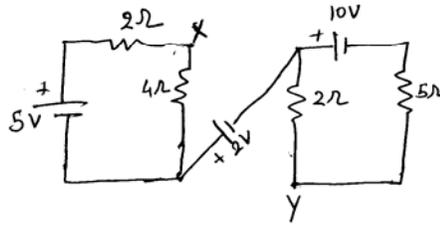


Fig-2

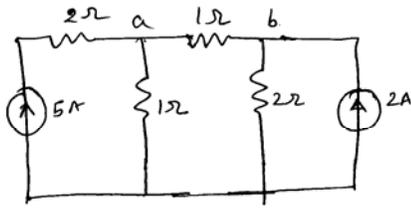


Fig-3

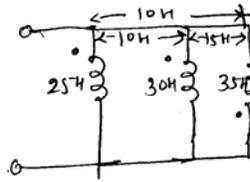


Fig-5

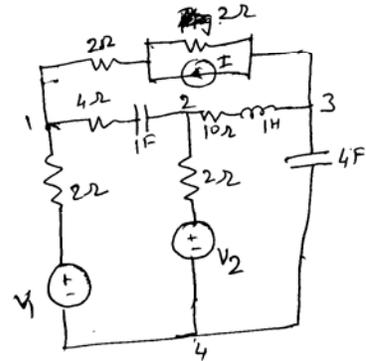


Fig-4

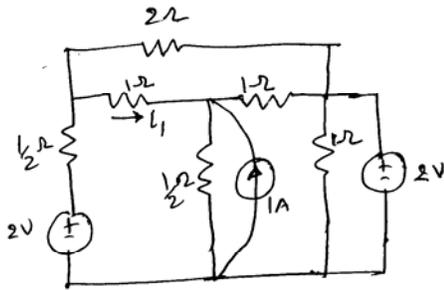


Fig-6

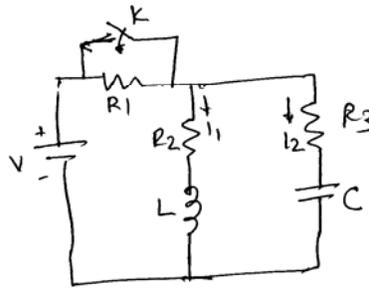


Fig-7

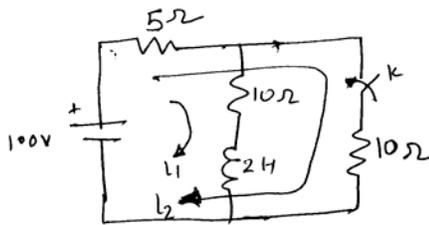


Fig-8

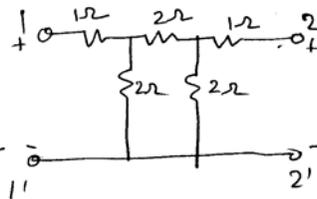


Fig-9

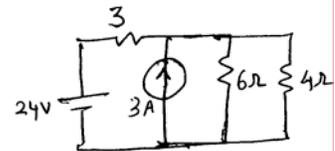


Fig-10