

KADI SARVA VISHWAVIDHYALAYA

BE Semester:- III

Subject Code:-EE302/EC302

Subject Name:- CIRCUIT THEORY

Date:- 25/11/2013

Time:- 10:00 am to 1:00 pm

Total Marks :- 70

Instructions:

1. Answer each section in separate answersheet.
2. Use the scientific calculator is permitted.
3. All questions are **Compulsory**.
4. Indicate **Clearly**, the options you attempt along with its respective question numbers.
5. Use last page of main supplementary of **rough work**.
6. All the value of **resistance** and **impedance** in ohm.

Section - I

Q.1 (All compulsory)

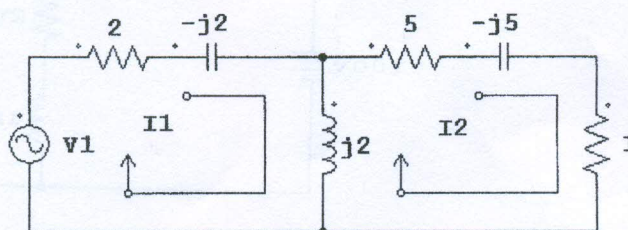
- [A] Define Terms: 1) Active Element 2) Lumped element 3) Planar Network 4) Co-tree 5) Distributed Element. [5]
- [B] What is Duality? Describe the procedure to draw the dual network. [5]
- [C] Explain classification of energy sources. [5]

OR

- [C] Draw dual network of given figure in question 2(B) [5]

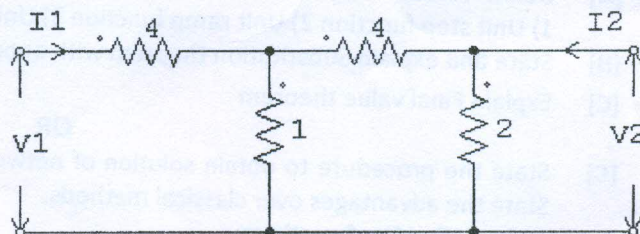
Q.2 Answer the Following Questions:

- [A] Explain Millman's Theorem with appropriate example. [5]
- [B] Determine the current I_1 , I_2 flowing into network by using mesh analysis shown in fig. [5]
- $V_1 = 10 \angle 0$



OR

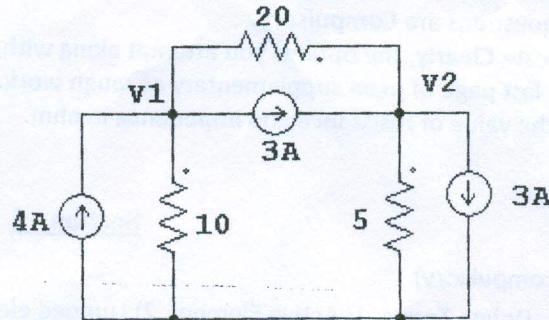
- [A] Obtain ABCD parameter for the network shown in fig. [5]



- [B] Draw and Explain equivalent circuit of two-port network using H-parameter. [5]

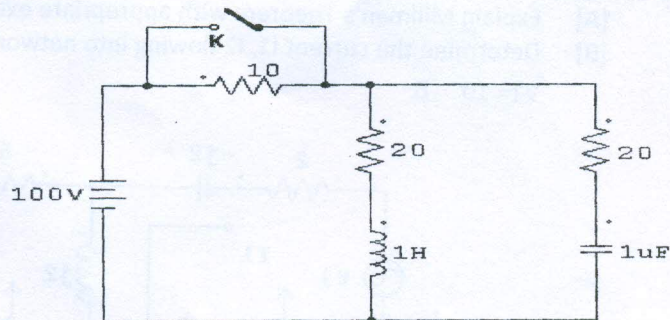
Q.3 Answer the Following Questions:

- [A] Derive the ABCD parameter from Two-port network and prove that, for reciprocal linear time invariant two port-network $AD - BC = 1$. [5]
- [B] Determine the node voltage V_1 & V_2 shown in below fig. By using Nodal analysis. [5]



OR

- [A] Explain how to determine initial condition in RL network and the current $i(t)$ based on this condition. [5]
- [B] In this network switch k is open at steady state condition and at time $t=0$ switch is closed. Determine 1) $V_c(0^-)$ 2) i_1 and i_2 at $t=0^+$ 3) di_1/dt and di_2/dt at $t=0^+$ [5]



Section - II

Q.4 (All compulsory)

- [A] Define Terms: [5]
1) Unit step function 2) Unit ramp function 3) Unit impulse function 4) KCL 5) KVL.
- [B] State and explain Substitution theorem with appropriate example. [5]
- [C] Explain Final value theorem [5]

OR

- [C] State the procedure to obtain solution of network using Laplace transform technique. [5]
State the advantages over classical methods.

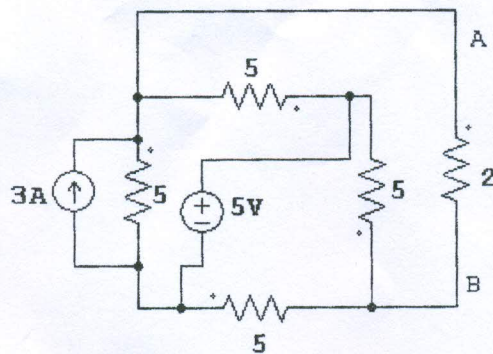
Q.5 Answer the Following Questions:

- [A] State and explain Super position Theorem with appropriate example. [5]
- [B] Explain Initial value theorem [5]

OR

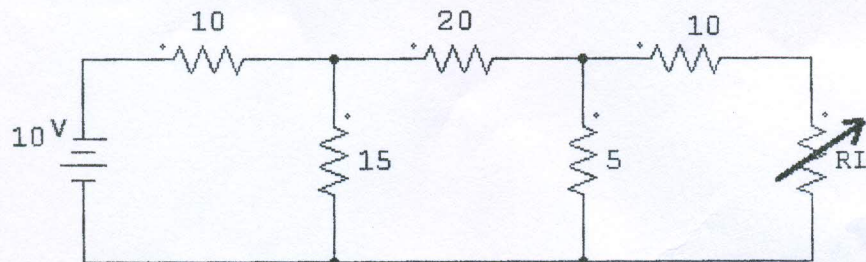
- [A] State and explain Thevenin's Theorem with appropriate example. [5]

- [B] Determine the current flowing through $2\ \Omega$ resistor of network shown in fig. 1 using thevenin's theorem. [5]



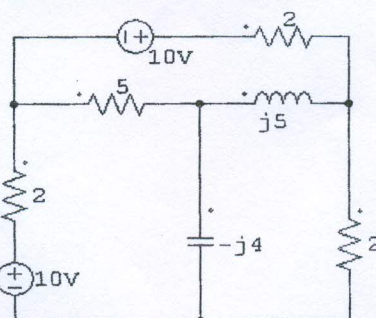
Q.6 Answer the Following Questions:

- [A] State and Explain maximum power transfer theorem. Determine the condition for maximum power transfer to the load for D.C circuit. [5]
 [B] Determine the value of R_L that will cause the power in R_L to have maximum value. And what will be the value of power transfer under this condition.? [5]



OR

- Q.6 [A] Explain incident matrix of linear oriented graph with an example. [5]
 [B] Draw tree of the network shown in fig. taking the branches having 5 , $j5$ and $-j4$ ohm as a tree branches. Give the fundamental loop matrix of given network. [5]



All the Best

Kadi Sarva Vishwavidyalaya

BE SEMESTER III

Subject Code: EE302/EC 302

Date: 24/04/2014

Time: 10:30 To 1:30

Subject: CIRCUIT THEORY

Max. Marks: 70

Instruction: (1) Attempt all questions.

(2) Figures to the right indicate full marks.

(3) Answer each section in separate answer sheet.

(4) Use the scientific calculator is permitted.

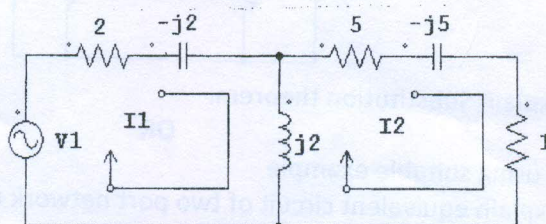
(5) All the value of resistance in Ohm.

Section - I

- Q.1 [A] Define: [5]
 Explain: 1) Active Element 2) Lumped element 3) Planner Network 4) Tree 5) Co-tree
 [B] Explain Duality with appropriate example. [5]
 [C] State and Explain Reciprocity theorem. [5]

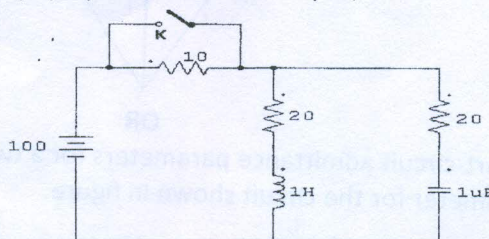
OR

- [C] Explain the Rules for source transformation technique. [5]
 Q.2 [A] State and explain Super position Theorem with example. [5]
 [B] Determine the current I_1 , I_2 flowing into network by using mesh analysis shown in figure $V_1 = 10 \angle 0^\circ$ [5]

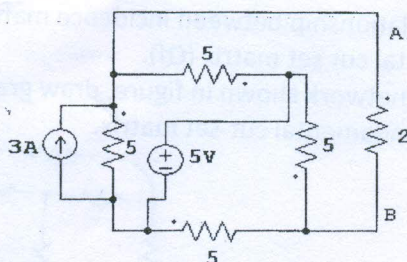


OR

- Q.2 [A] Explain the rules for initial conditions in $t=0^+$ and $t=0^-$ condition for R, L and C. [5]
 [B] In this network switch k is open at steady state condition and at time $t=0$ switch is closed. Determine 1) $V_c(0^-)$ 2) i_1 and i_2 at $t=0^+$ 3) di_1/dt . [5]



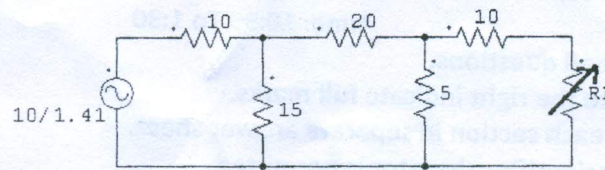
- Q.3 [A] State and explain Thevenin's Theorem with example. [5]
 [B] Determine the current flowing through 2Ω resistor of network shown in below figure using Thevenin's theorem. [5]



OR

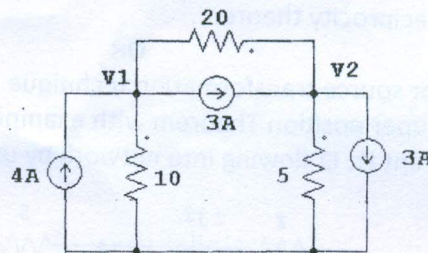
- Q.3 [A] State and Explain Maximum power transfer Theorem with example. [5]

- [B] Determine the value of R_L that will cause the power in R_L to have maximum value. And what will be the value of power transfer under this condition.? [5]



Section – II

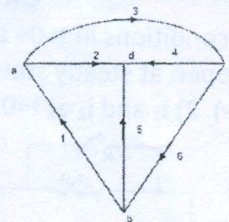
- Q.4 [A] Define:
1) loop 2) Distributed Element 3) Node 4) Junction 5) Dependent Source [5]
[B] Determine the Node voltage V_1 & V_2 shown in below figure. [5]



- [C] State and Explain Substitution theorem. [5]

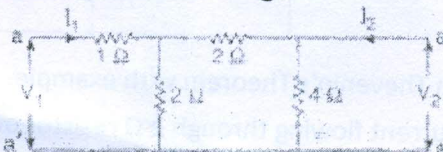
OR

- [C] Explain KVL using suitable example [5]
Q.5 [A] Draw and explain equivalent circuit of two port network using h-parameters. [5]
[B] Determine the cut-set matrix of the oriented graph shown in figure [5]

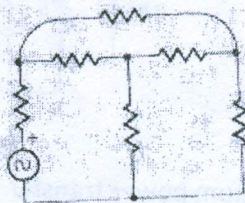


OR

- Q.5 [A] Explain the Short-circuit admittance parameters for a two port network. [5]
[B] Find the Y-parameter for the circuit shown in figure. [5]



- Q.6 [A] Derive inter relationship between incidence matrix (A), fundamental tie set matrix (Bf) and fundamental cut set matrix (Qf). [5]
[B] For a resistive network shown in figure, draw graph and tree of the network. Also develop the fundamental cut-set matrix. [5]



OR

- Q.6 [A] Explain the the open-circuit impedance parameters for a two port network. [5]
[B] Explain final value theorem. [5]