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) Planner 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

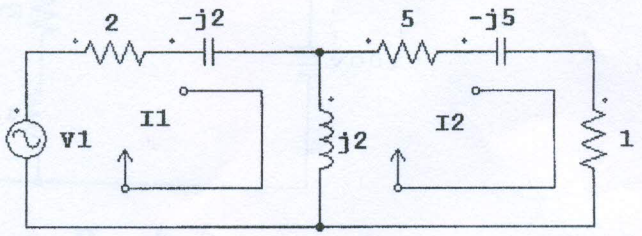
[C] Draw dual network of given figure in question 2(B) **[5]**

Q.2 Answer the Following Questions:

[A] Explain Millman's Theorem with appropriate example. **[5]**

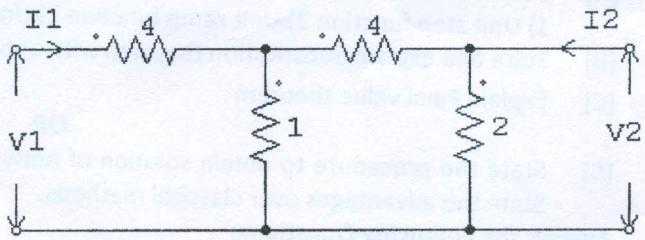
[B] Determine the current I1, I2 flowing into network by using mesh analysis shown in fig. **[5]**

V1= 10 ∠ 0



OR

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

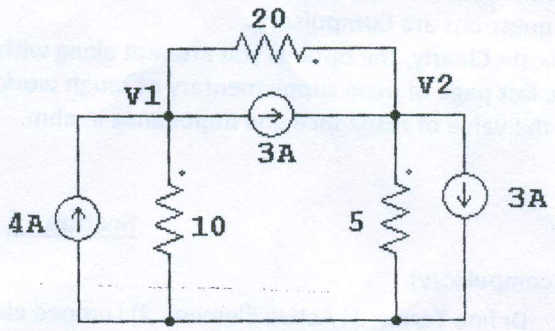


[B] Draw and Explain equivalent circuit of two-port network using H-parameter. **[5]**

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]**

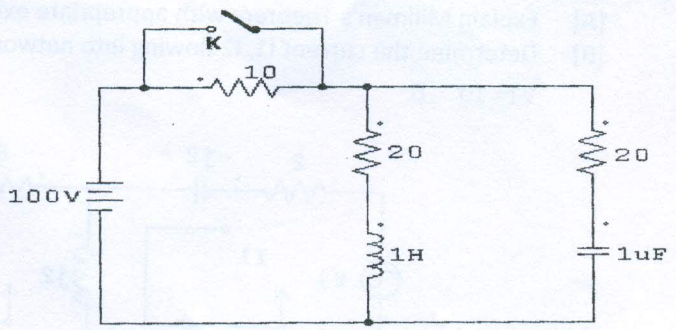
[B] Determone the nodel voltage V1 & V2 shown in below fig. By using Nodel analysis. **[5]**



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) Vc (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. State the advantages over classical methods. **[5]**

Q.5 Answer the Following Questions:

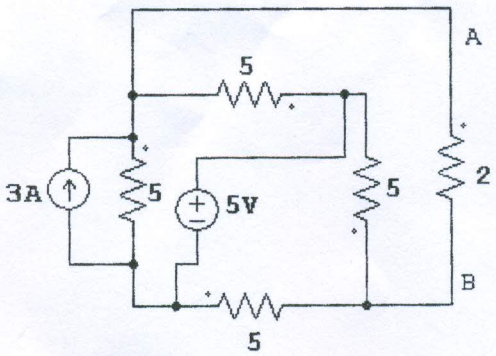
[A] State and explain Super position Theorem with appropriate example. **[5]**

[B] Explain Initial value theorem **[5]**

OR

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

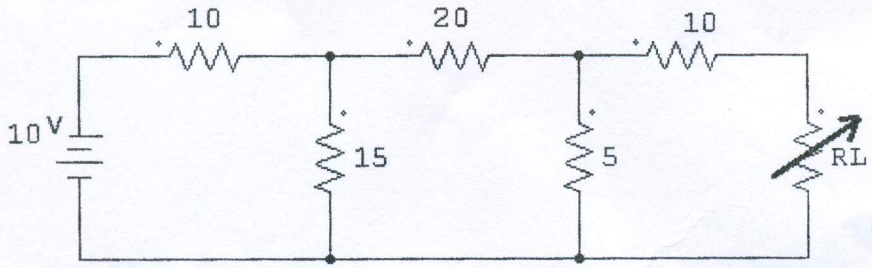
[B] Determine the current flowing through 2 Ω resistor of network shown in fig. 1 using thevenin's theorem. [5]



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]

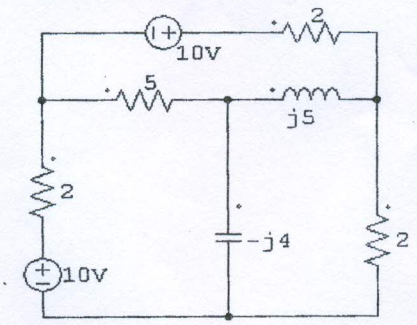
[B] Determine the value of Rl that will cause the power in Rl to have maximum value. And what will be the value of power transfer under this condition.? [5]



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 **Subject: CIRCUIT THEORY**

Date: 24/04/2014 **Time: 10:30 To 1:30** **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]**

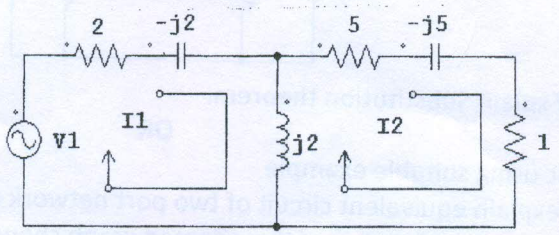
[C] State and Explain Reciprocity theorem. **[5]**

OR

[C] Explain the Rules for source transformation technique. **[5]**

Q.2 **[A]** State and explain Super position Theorem with example. **[5]**

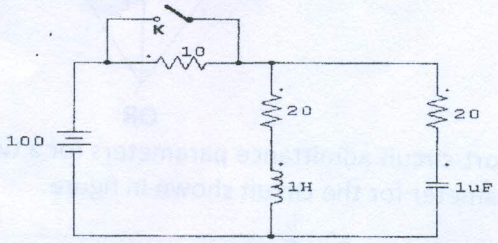
[B] Determine the current I1, I2 flowing into network by using mesh analysis shown in figureV1= 10 ∠ 0 **[5]**



OR

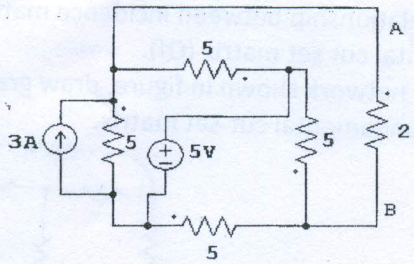
Q.2 **[A]** Explain the rules for initial conditions in t=0+ and t=0- condition for R, L and C. **[5]**

[B] In this network switch k is open at steady state condition and at time t=0 switch is closed. Determine 1) Vc (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]**

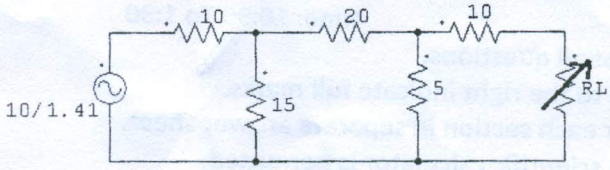
[B] Determine the current flowing through 2 Ω resistor of network shown in below figure using Thevenin's theorem. **[5]**



OR

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

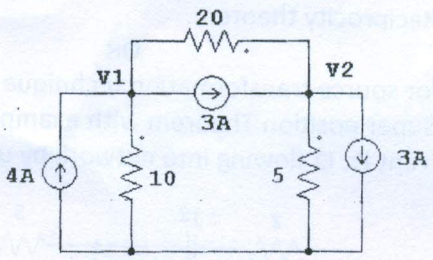
[B] Determine the value of Rl that will cause the power in Rl to have maximum value. And what will be the value of power transfer under this condition.? [5]



Section – II

Q.4 [A] Define: [5]
1)loop 2)Distributed Element 3)Node 4) Junction 5)Dependent Source

[B] Determine the Node voltage V1 & V2 shown in below figure. [5]



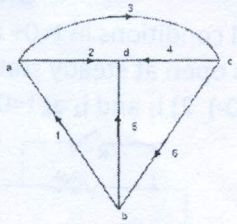
[C] State and Explain Substitution theorem. [5]

OR

[C] Explain KVL using suitable example [5]

Q.5 [A] Draw and explain equivalent circuit of two port network using h-parameters. [5]

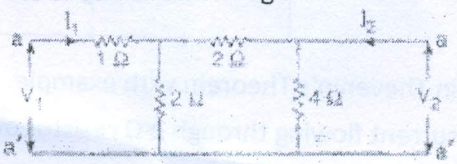
[B] Determine the cut-set matrix of the oriented graph shown in figure [5]



OR

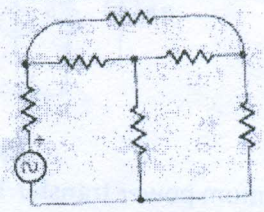
Q.5 [A] Explain the Short-circuit admittance parameters for a two port network. [5]

[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]

******Best of luck******

KADI SARVA VISHWAVIDYALAYA

B.E SEMESTER 3RD EXAMINATION (November/2014)

SUBJECT CODE: EC302/EE302 SUBJECT NAME: Circuit Theory

DATE: 13/11/2014 TIME: 10:30 TO 1:30 TOTAL MARKS: 70

Instructions:

1. Answer each section in separate Answer sheet.
2. Use of scientific calculator is permitted.
3. All questions are compulsory.
4. Indicate clearly, the options you attempted along with its respective question number.
5. Use the last page of main supplementary for rough work.

Section – 1

Q.1. Answer the following.

(a) Explain Classification of Network with suitable examples. 5

(b) A current source having waveform as shown in fig. 1 is connected across the terminals of an inductor of 10mH. Show (i) Voltage Waveform (ii) the charge waveform through device. Assume the initial conditions zero. 5

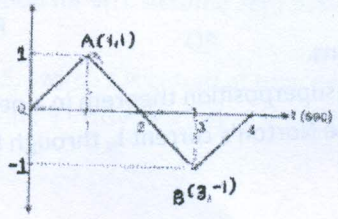


Fig.1

(c) In the given circuit of fig. 2, the switch k is closed at t=0. The current in the circuit is given by the equation $i = 2(1-e^{-t})$ A. t>0. At time t = 1sec, find (i) Value of current (ii) Rate of change of current (iii) Total flux linkages (iv) Rate of change of flux linkages (v) voltage across the inductor. 5

OR

(c) Determine the inductance between the terminals for a three coil as shown in fig. 3. 5

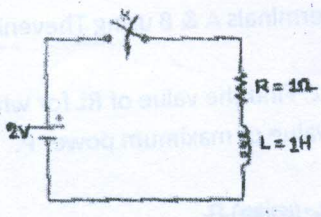


Fig. 2

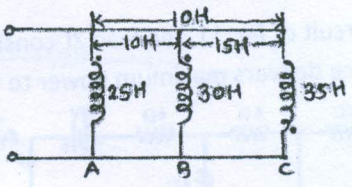


Fig. 3

Q.2. Answer the following Questions.

(a) Determine the current through the 4Ω resistor branch of the given network of fig.4 using mesh analysis. 5

(b) Find V_1 & V_2 for given network of fig. 5, using nodal analysis. 5

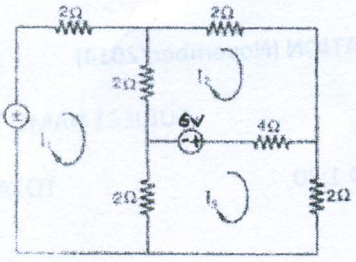


Fig. 4

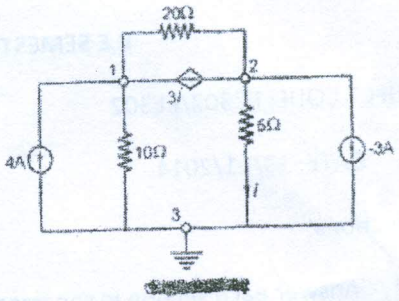


Fig. 5

OR

(a) Use nodal analysis to find voltage across 5Ω resistor in the circuit as shown in fig 6. 5

(b) For a network of fig 7 , determine the current I_x using mesh analysis. 5

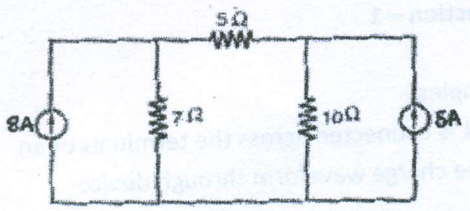


Fig. 6

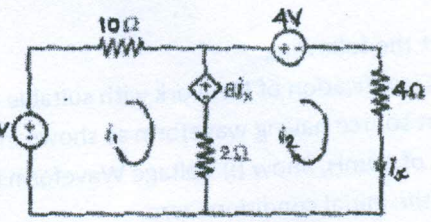


Fig. 7

Q.3. Answer the following Questions.

(a) Determine the value of i_1 using superposition theorem in a network of fig 8. 5

(b) For the network of fig 9, find the Norton's current I_N through R=1 Ω using Norton's theorem. 5

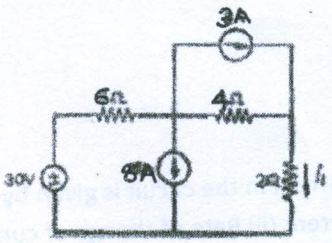


Fig. 8

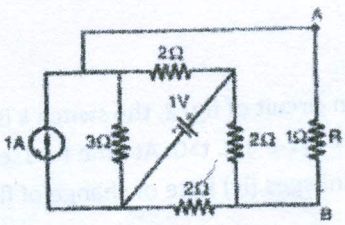


Fig. 9

OR

(a) For the network of fig. 10, find Thevenin's voltage V_{TH} between terminals A & B using Thevenin's theorem. 5

(b) In the circuit of fig. 11, the load ZL consists of a pure resistance RL. Find the value of RL for which the source delivers maximum power to the load. Determine the value of maximum power P. 5

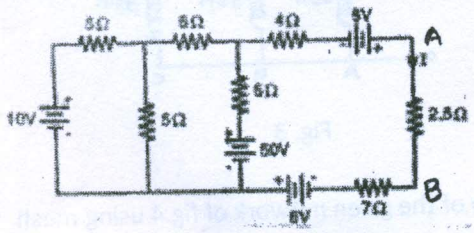


Fig. 10

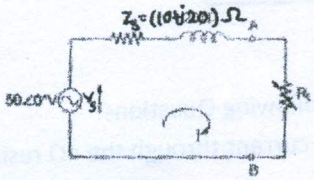


Fig. 11

Section – 2

Q.4. Answer the following.

(a) In the network of fig. 12, the switch k is changed from position 1 to 2 at t=0. Find values of i, di/dt and d^2i/dt^2 at t=0+ if R = 1000 Ω, L = 1 H, C = 0.1 uF and V = 100V. 5

(b) In the network of fig. 13, the switch k is in position 'a' for a long period of time. At t = 0, the switch is moved from 'a' to 'b'. Find $V_2(t)$. 5

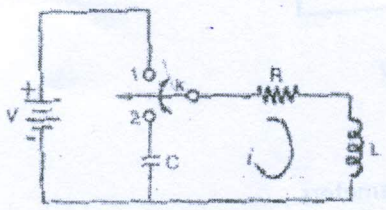


Fig. 12

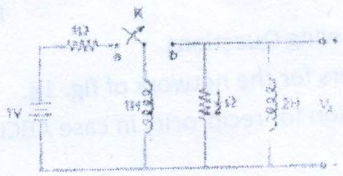


Fig. 13

(c) In the circuit of fig. 14, the parameter values are shown on diagram. The switch k is opened at time t = 0. Obtain particular solution for v(t). Assume zero initial conditions. 5

OR

(c) In a series R-L-C network, of fig 15, switch k is closed at time t = 0, Determine the particular solution for i(t) for the element values given : V = 10V, R = 2 Ω , L = 1 H, C = 0.2 F. 5

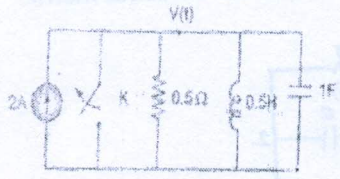


Fig. 14

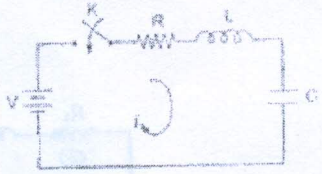


Fig. 15

Q.5. Answer the following Questions.

(a) Find Z – parameters for the network of fig. 16 5

(b) Derive the relationship between z- parameters and y- parameters. 5

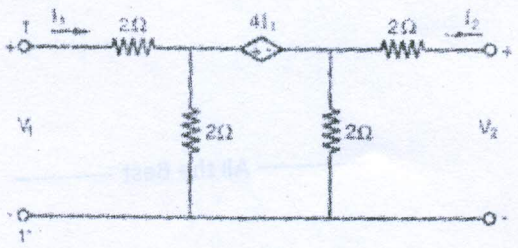


Fig. 16

OR

(a) Find Laplace transformation of functions (i) Unit step u(t) and (ii) e^{at}. 5

(b) Find Laplace Transformation of current i(t) in the network shown in fig.17, Assume zero current through the inductor before application of voltage. 5

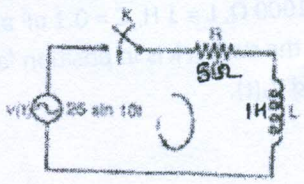


Fig. 17

Q.6. Answer the following Questions.

(a) Find h –parameters for the network of fig. 18. 5

(b) Derive the condition for reciprocity in case ABCD parameters. 5

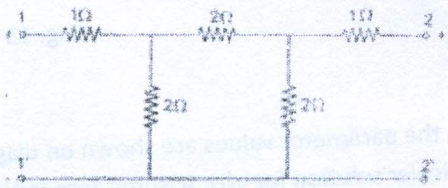


Fig. 18

OR

(a) Define the terms : (i) Node (ii) Graph (iii) Loop (iv) Tree and (iv) co-tree. 5

(b) For the circuit shown in fig.19 , draw the oriented graph and write the incidence matrix. 5

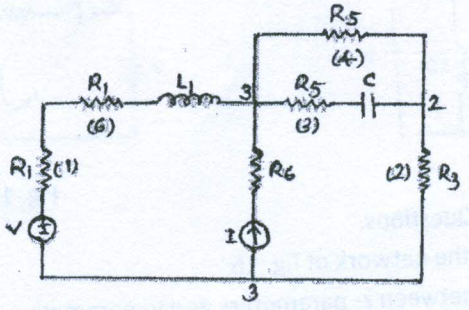


Fig. 19

---------- All the Best ----------

KADI SARVA VISHWAVIDYALAYA

BE SEMESTER – III EXAMINATION (DEC/2015)

SUBJECT CODE: **EE302/EC302** SUBJECT NAME: **CIRCUIT THEORY**

DATE: **01/12/2015** TIME: **10:30 A.M. TO 1:30 P.M.** TOTAL MARKS: **70**

Instructions:

1. Answer each section in separate Answer sheet.
2. Use of scientific Calculator is permitted.
3. All questions are compulsory.
4. Indicate **clearly**, the options you attempted along with its respective question number
5. Use the last page of main supplementary for rough work.

Section-1

Q-1 **(All Compulsory)**

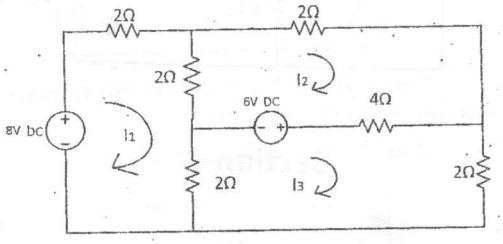
[A] Explain classification of network. [05]

[B] Explain KCL and KVL using suitable example. [05]

[C] Write dot convention for coupled coils. [05]

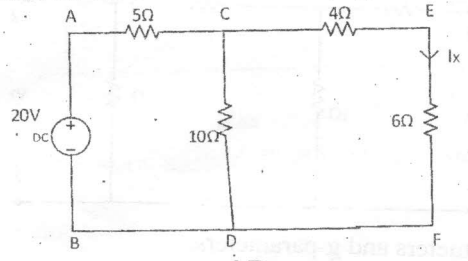
OR

[C] Determine the current through the 4 ohm resistor branch of the given network of fig.1 using mesh analysis. [05]



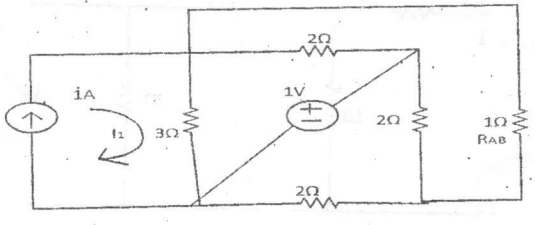
Q-2 [A] State and explain Super Position Theorem. [05]

[B] Verify reciprocity theorem for the network shown in fig. 3 [05]



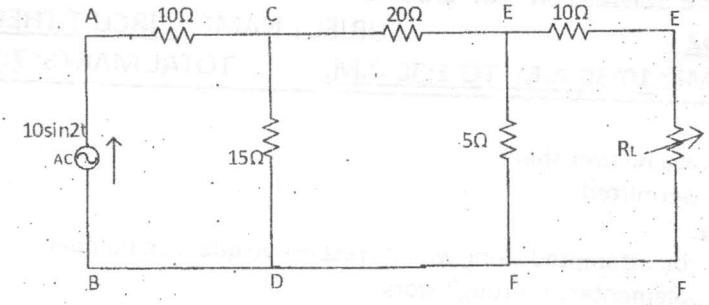
OR

Q-2 [A] Determine the current in 1Ω resistor of the network shown in fig. 2 using Thevenin's theorem. [05]



[B] Explain Maximum Power Transfer Theorem. [05]

Q-3 [A] For the network shown in fig.4, determine the value of R_L that will cause the power in R_L to have maximum value. What will be the value of power transfer under this condition? [05]

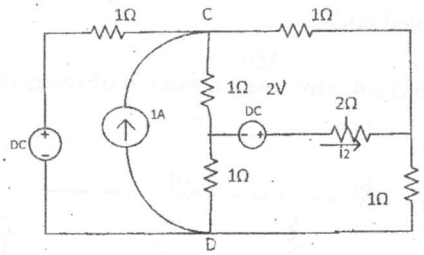


[B] Explain compensation theorem. [05]

OR

Q-3 [A] Explain source transformation. [05]

[B] In the network of fig. 5 determine the numerical value of i_2 using source transformation. [05]

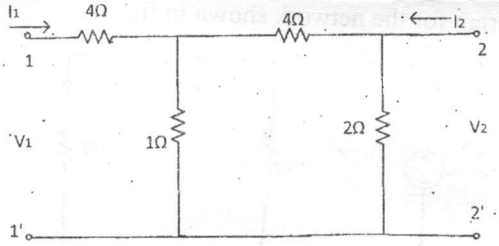


Section-2

Q-4 **(All Compulsory)**

[A] Relation between z-parameters and y-parameters. [05]

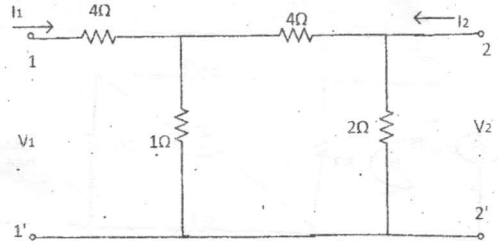
[B] Determine H-parameters and G-parameters for given circuit shown in fig.6 [05]



[C] Relation between h-parameters and g-parameters. [05]

OR

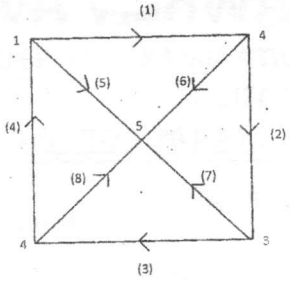
[C] Determine transmission parameters for given circuit shown in fig.7 [05]



Q-5 [A] Define the following with suitable fig. (1) Node (2) Branch (3) Loop (4) Mesh (5) graph [05]

[B] For the circuit shown in fig 8 draw the oriented graph and write (i) incidence matrix, (ii) [05]

tie set matrix, and (iii) f-cut set matrix.

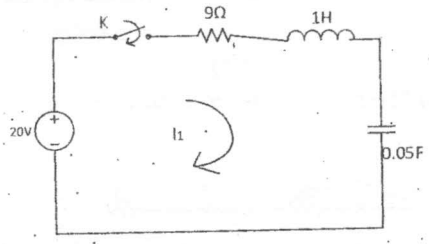


OR

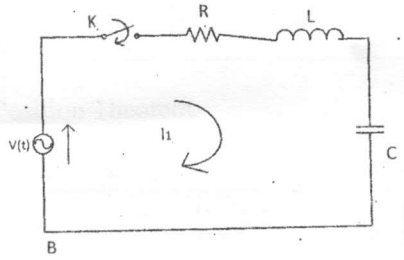
Q-5 **[A]** Explain KVL equation for graph theory. **[05]**

[B] Explain how to determine the initial conditions in an RL network and the current i(t) based on these conditions. **[05]**

Q-6 **[A]** In the circuit of fig. 9 switch K is closed at t = 0. For the element values given, obtain the general solution and the particular solution for current i(t). obtain the value of current at time t = 0.1 sec. **[05]**



[B] In fig. 10 series R-L-C circuit of fig. 10 R = 5Ω, L = 1H, C = 0.25F and $v(t) = 6\,e^{-2t}$ volts. Switch K is closed at time t = 0. Obtain particular solution for the current using Laplace transform method. Assume zero initial conditions in the elements. **[05]**



OR

Q-6 **[A]** Explain The Laplace Transformation method. Find Laplace Transform of Unit Step, and exponential function. **[05]**

[B] Explain initial and final value theorem. **[05]**

----------All The Best----------

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