Seat No:-_____

GANPAT UNIVERSITY
B.TECH SEM.3rd ELECTRICAL ENGINEERING
REGULAR EXAMINATION NOV-DEC 2012
2EE302: CIRCUIT ANALYSIS

TIME:-3 HOURS TOTAL MARKS-70

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

Section-I

Q - 1 (A) In the given circuit of fig 1, the switch K is moved from position a to b at time t = 0, the steady state having previously established. Find the particular solution for the current using Laplace Transform method. [6]

(B) In a network shown in fig 2, a steady state is reached with switch k open. At t=0, the switch is closed. Determine the values of $V_a(0-)$, $V_a(0+)$, $V_b(0-)$ and $V_b(0+)$. [6]

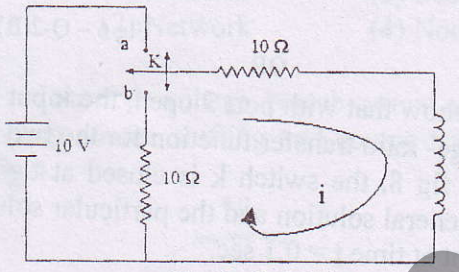

Fig 1- Q-1 (A)

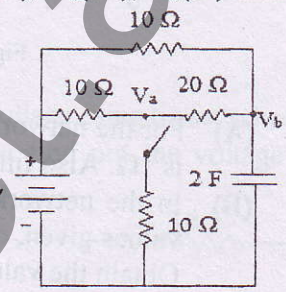

Fig 2 – Q–1(B)

OR

Q - 1 (A) In the network of fig3, 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. [6]

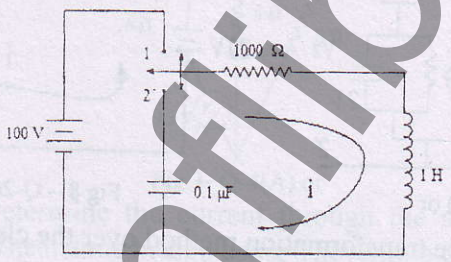

Fig 3 – Q-1(A) or

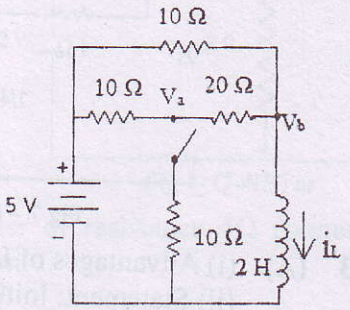

Fig 4 – Q-1(B) or

(B) In the network shown in fig 4, a steady state is reached with switch k open. At t=0, the switch is closed. Obtain particular solution for Va at node a for t > 0. using differential equation method. [6]

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Q - 2 (A) For the waveform shown in below fig 5, write its equation and determine its Laplace transform. [5]

(B) For R-C two-port network shown in below fig 6, show that [6]

$$G_{12} = \frac{1/(R_1R_2C_1C_2)}{S^2 + \frac{(R_1C_1+R_1C_2+R_2C_2)S}{R_1C_1R_2C_2} + \frac{1}{R_1R_2C_1C_2}}$$

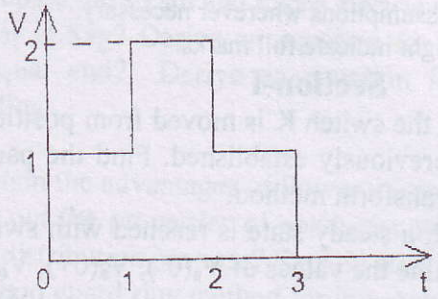

Fig 5 – Q-2(A)

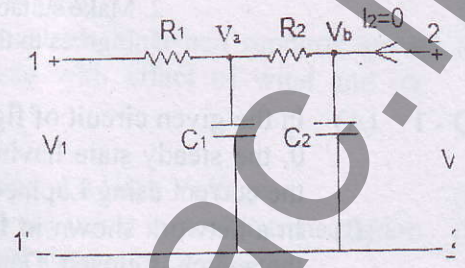

Fig 6 – Q-2(B)

OR

Q - 2 (A) For the network of fig 7, show that with port 2 open, the input impedance at port 1 is 1Ω. Also find the voltage- ratio transfer function for the two port network. [6]

(B) In the network of below fig 8, the 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. [5]

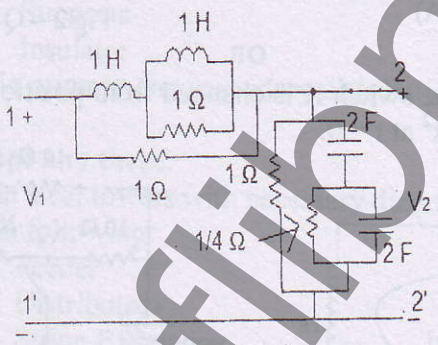

Fig 7 – Q-2(A) or

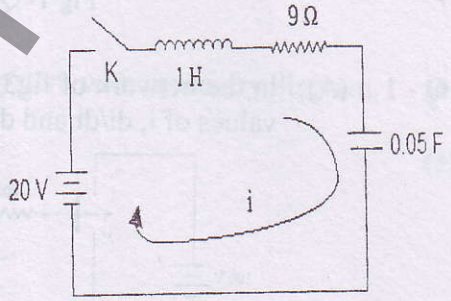

Fig 8 – Q-2(B) or

Q - 3 (A) (i) Advantages of Laplace transformation method over the classical methods. [4]
(ii) Statement: Initial and final value theorem.

(B) Explain: (i) High pass filter (ii) Band stop filter [4]

(C) Draw and Explain the transform networks of the following elements (i)Resistance (ii) inductor with initial current $I_L(0-)$ (iii) capacitor with initial voltage $V_C(0-)$ [4]

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Section-II

Q-4 (A) Write the mesh equation and find the mesh current I_X for fig 1. [4]

(B) Find the current through various resistance in the network as shown in fig 2 using nodal analysis. [4]

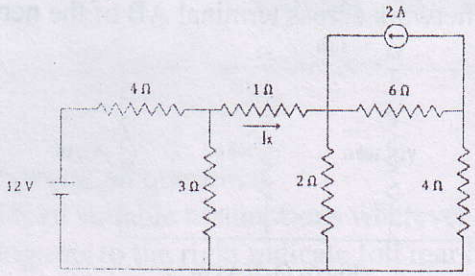

Fig 1- Q-4(A)

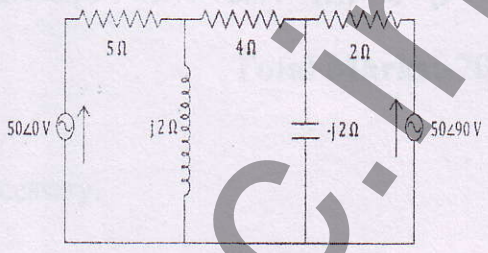

Fig 2- Q-4(B)

(C) Define Following. [4]

(1) Element (3) Loop

(2) Network (4) Node

OR

Q - 4 (A) Find the node voltage, branch current and branch voltage using tie set schedule fig 3. [8]

(B) Using source shifting and source transformation find out the voltage Vx in the fig.4 [4]

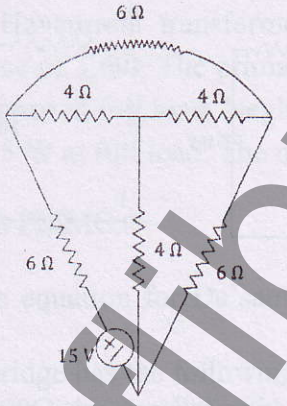

Fig 3- Q-4(A) or

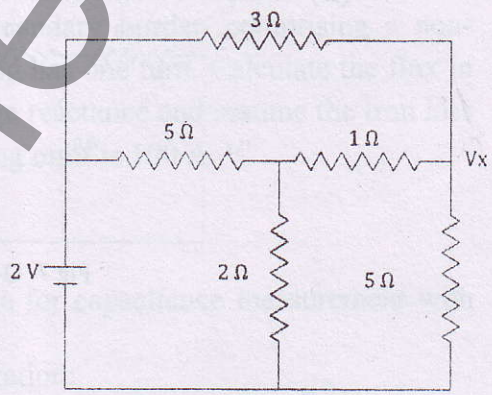

Fig 4- Q-4(B) or

Q - 5 (A) Determine the current through the ammeter of resistance 4Ω connected in the Wheatstone bridge using Thevenin's theorem. [6]

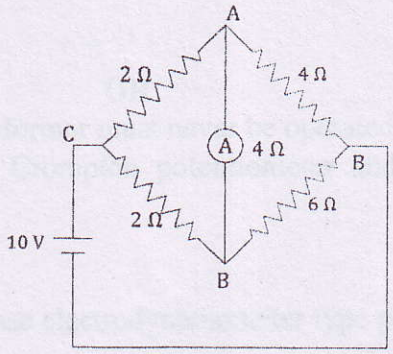

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Fig 5- Q-5(A)

(B) State the Maximum Power transfer theorem and derive the condition when load consists of a variable resistance. [5]

OR

Q - 5 (A) Find Norton's equivalent network across terminal AB of the network shown in fig [6]

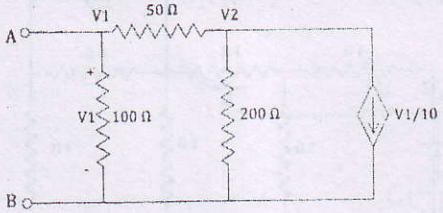

Fig 6- Q-5(A) or

(B) Explain Reciprocity theorem with suitable example. [5]

Q - 6 Answer the following question. Any Three [12]

(A) Discuss the Z parameter for two port network and derive the condition for reciprocity and symmetry network.

(B) Find H Parameter for a given network as shown in fig 7 and find whether the network is reciprocity or not.

(C) Give the relation between Z parameter and Y parameter.

(D) Find Y Parameter for fig 8 and find whether the network is reciprocity or not.

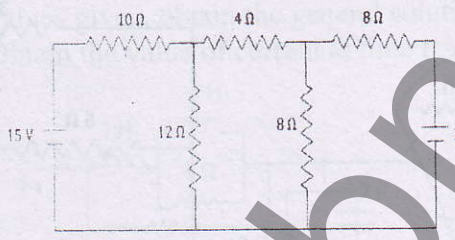

Fig 7- Q-6(B)

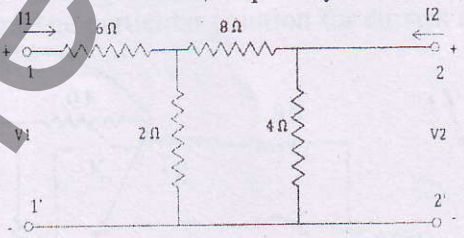

Fig 8- Q-6(D)

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