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) Find the Laplace transform of the staircase type voltage waveform shown in figure 1. **[06]**

(b) Determine the voltages of node 1 and node 2 in the network shown in figure 2 using input and output admittances. **[06]**

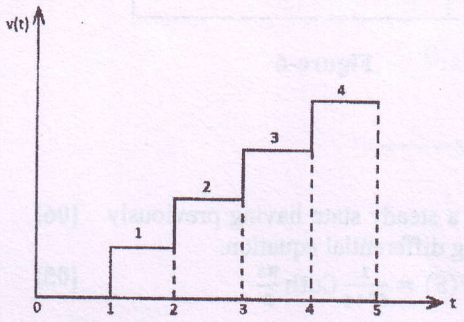


Figure-1

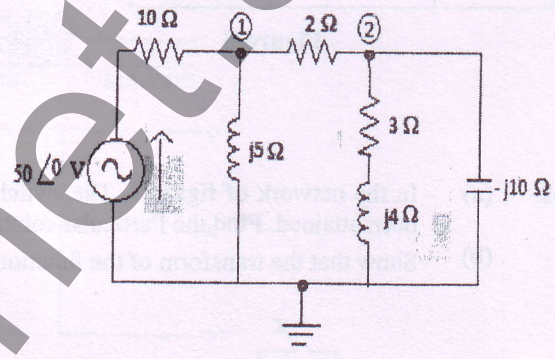


Figure-2

OR

Q-1 (a) In the network shown in figure 3, a steady state is reached with switch k open. At t=0, the switch is closed. For the element values given, determine the value of Va(0-) and Va(0+). **[06]**

(b) Determine the current through j10 Ω impedance in a network of figure 4 using mesh current analysis. **[06]**

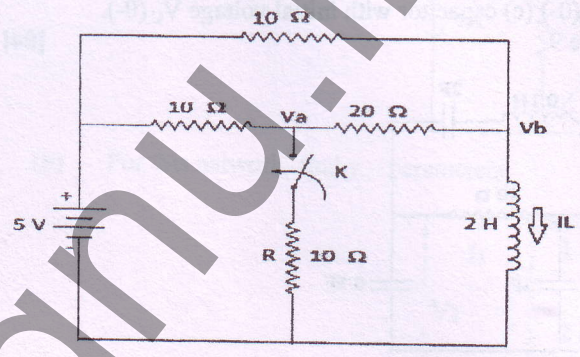


Figure-3

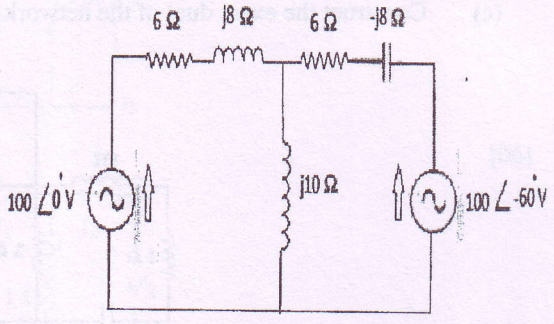


Figure-4

Q-2 (a) In the given circuit of figure 5, the switch K is moved from position atob at time t = 0, the steady state having previously established. Find the particular solution for the current using Laplace transform method. [06]

(b) In the network of figure 6, the switch k is moved from position a to position b at t=0 (a steady state existing in position a before t=0). Solve for the current i(t) using the Laplace transformation method. [05]

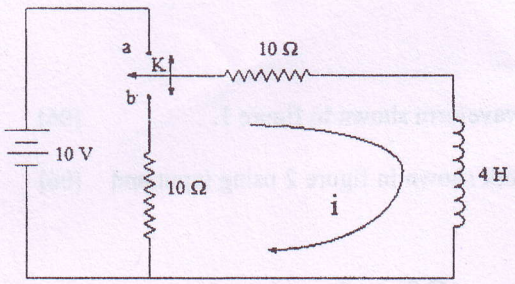


Figure-5

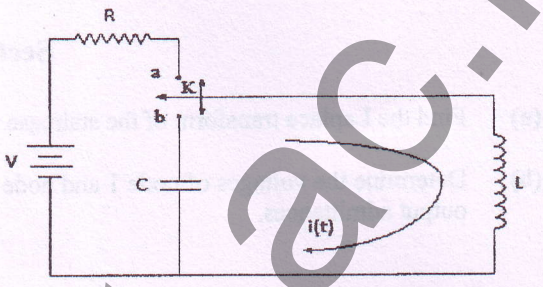


Figure-6

OR

Q-2 (a) In the network of figure 7, The switch K is closed at t = 0, a steady state having previously been attained. Find the Particular solution for the current using differential equation. [06]

(b) Show that the transform of the function shown in figure 8 is $V(S) = \frac{1}{S^2+1} \text{Coth} \frac{\pi s}{2}$ [05]

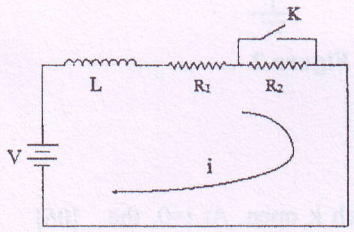


Figure-7

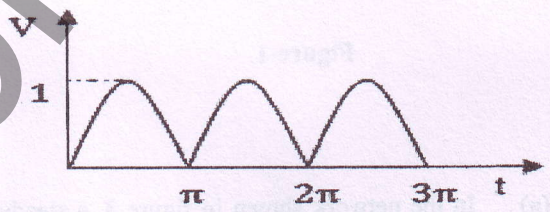


Figure-8

Q-3 (a) Explain the initial value theorem and final value theorem. [04]

(b) Draw and Explain the transform networks of the following elements [04]
(a)Resistance (b) inductor with initial current $I_L(0-)$ (c) capacitor with initial voltage $V_C(0-)$.

(c) Construct the exact dual of the network of figure 9. [04]

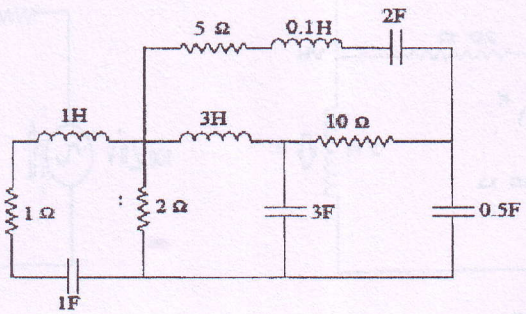
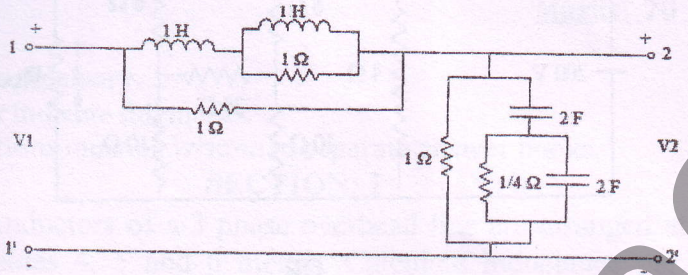


Figure-9

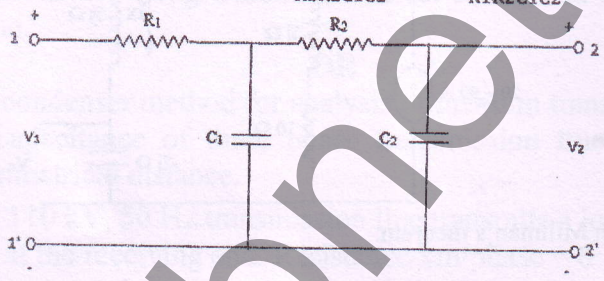
Section-II

Q-4 (a) For the network of figure, show that with port 2 open, the input impedance at the port 1 is 1 Ω. [06]
Also find the voltage ratio transfer function $G_{12}(s)$ for the two port network.



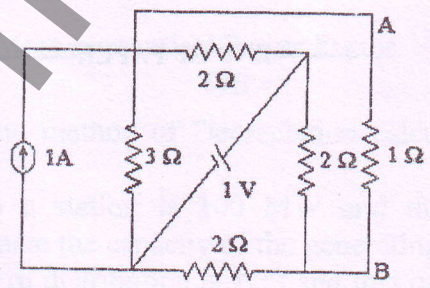
(b) For R-C two port network shown in figure, show that [06]

$$G_{12}(s) = \frac{1/R_1R_2C_1C_2}{s^2 + \frac{(R1C1+R1C2+R2C2)s}{R1R2C1C2} + \frac{1}{R1R2C1C2}}$$

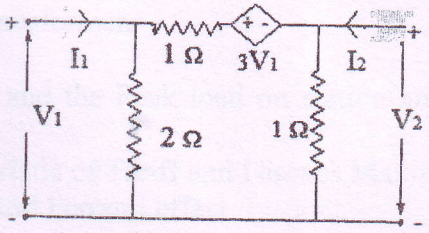


OR

Q-4 (a) Determine the current in 1 Ω resister of the network shown in below Figure, using Norton's theorem. [06]

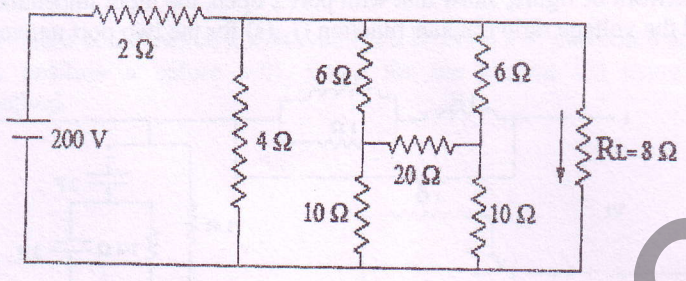


(b) For this network, find y – parameters. [06]



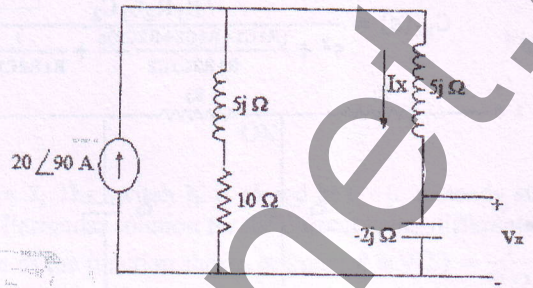
Q -5 (a) Explain Symmetry and Reciprocity condition in terms of y-parameters. [05]

(b) Find the current through a load of 8Ω in the circuit of below figure, with the help of Norton's theorem. [06]



OR

Q-5 (a) In the network of below figure, determine the voltage V_X. Then apply the reciprocity theorem and compare the two voltages. [06]



(b) State and explain Millman's theorem. [05]

Q-6 (a) Why do negative sign appear in the performance equations of a two port network in terms of ABCD-parameters? [04]

(b) Write the performance equation and draw an equivalent circuit of a two port network in terms of g- parameters. [04]

(c) Explain: (1) High-pass filter (2) Band-pass filter [04]

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