VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

B.E. (E.C.E.: CBCS) III-Semester Main Examinations, December-2017

Network Analysis

Time: **3** hours

Max. Marks: 70

Note: Answer ALL questions in Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

1. Differentiate between Network and Circuit.
2. State and prove Kirchhoff's current law
3. State and prove Super position theorem with simple circuit
4. Explain Tellegen's theorem
5. Explain the significance of initial conditions, with examples.
6. Define Zero input response, explain it with suitable example.
7. Draw the equivalent circuit of h-parameters.
8. Express Y-parameters in terms of Z-parameters.
9. In a series RLC circuit with resistance of 10K, inductance of 10mH and capacitance of 0.1μF, determine the quality factor.
10. What is transfer function? Write the transfer function of a Z_{LC} & Y_{LC}, functions.

Part-B (5 × 10 = 50 Marks)

11. a) Find the total power delivered in the circuit shown in Fig. 1 using mesh-current method. [8]

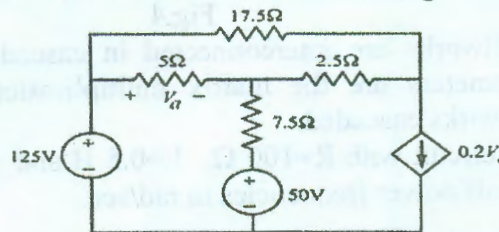

Fig.1

b) Explain the voltage division rule in series circuit of three impedances. [2]

12. a) If the following circuit satisfies the Maxim Power Transfer Theorem, find the power dissipated by Resistance R using Thevenin's theorem. [7]
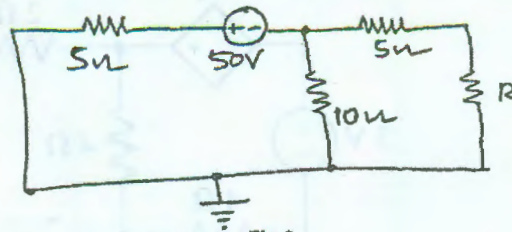

Fig. 2

b) Explain the procedure to find Thevenin's equivalent circuit, in the presence of dependent sources. [3]

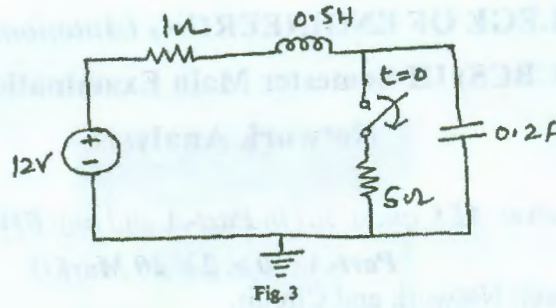13. a) Find $i_L(t)$ and $v_L(t)$ for the following circuit shown in fig 3. for all time. [7]

Fig. 3

b) A 137 pF capacitor is connected to a voltage source such that $Vc(t) = 12e^{-2t}$ V, $t \geq 0$ [3]
and $Vc(t) = 12$ V, $t < 0$. Calculate the energy stored in the capacitor at t equal to (a) 0;
(b) 200 ms.

14. a) Find Z- parameters for a given two port network shown in Fig.4 and also verify   [5]
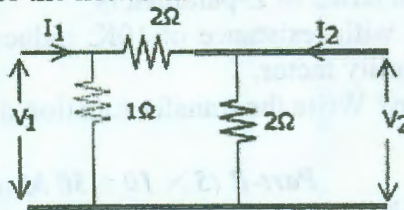reciprocity and symmetry for the network.

Fig.4

b) Prove that, if networks are interconnected in cascading manner, then the overall   [5]
transmission parameters are the matrix multiplication of individual transmission
parameters of networks cascaded.

15. a) A series resonant circuit with R=100 Ω, L=0.5 H and C = 40μ F calculate resonant,   [5]
lower and upper half power frequencies in rad/sec.

b) Synthesize the following function   in a Foster form II method. $Z(S) = \dfrac{S(S^2+16)}{(S^2+4)\ (S^2+25)}$ [5]

16. a) Determine the number of possible trees and draw all the possible trees for the   [5] directed
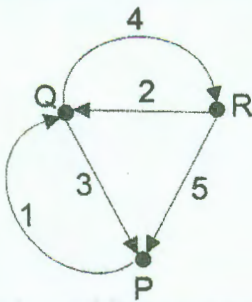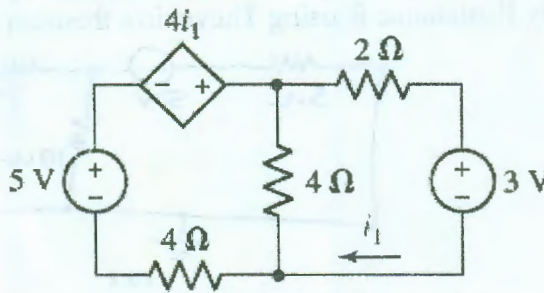graph given in the Fig. 5

Fig.5   Fig.6

b) Determine the current i_1 in the circuit shown in figure 6

17. Answer any *two* of the following:
    a) Write the characteristics of inducors and capacitors.   [5]
    b) Derive the condition of reciprocity for h-parameters   [5]
    c) Describe the variation of current, impedance, inductive and capacitive reactances and   [5]
    net reactance with respect to the frequency.

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