3E1614

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3E1614

B.Tech. III Semester (Main/Back) Examination, Dec. - 2016
Applied Elect. & Inst. Engg.
3AI3 Circuit Analysis & Synthesis
EC, EI, EX, AI, BM

Time : 3 Hours **Maximum Marks : 80**

Min. Passing Marks : 26

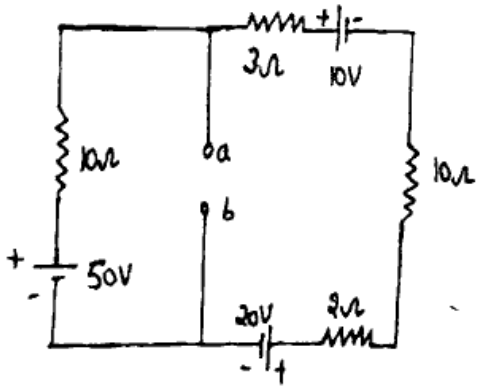
Instructions to Candidates:

*Attempt any **five** questions, selecting one question from **each unit**. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) State and explain Thevenin's theorem with the help of suitable example. **(8)**

   b) Using superposition theorem, find the current through a link is to be connected between terminals a-b. Assume the link resistance to be zero.

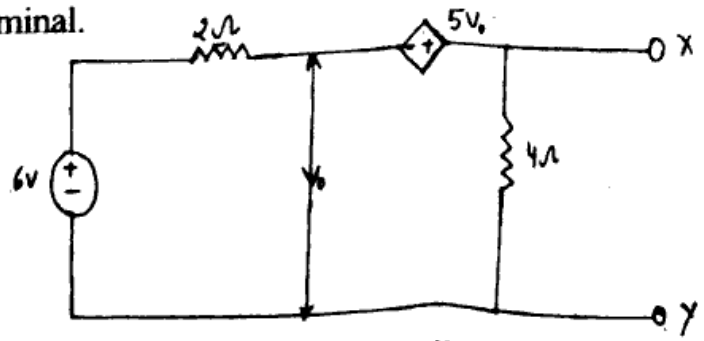


(8)

OR

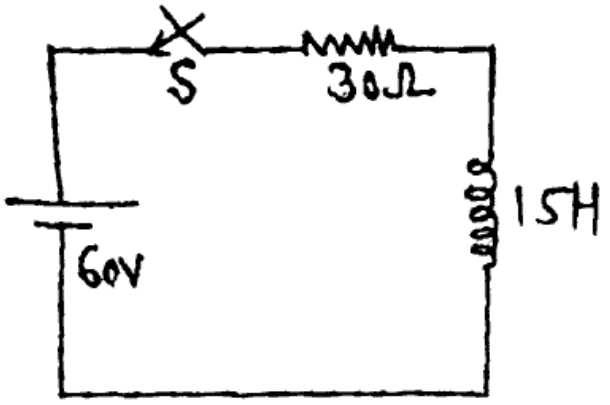
1. a) State and prove maximum power transfer theorem. **(8)**

   b) Find the Norton's equivalent of the circuit shown in figure at the left of X-Y terminal. **(8)**



Unit - II

2. a) A series RL circuit with $R = 30\Omega$ and L = 15 H has a constant voltage $V = 60V$ applied at t = 0 as shown in fig. Determine the current i, the voltage across resistor and the voltage across the inductor.



(8)

b) Explain different types of functions used in transient analysis. **(8)**

OR

2. a) Find the transient responses of :

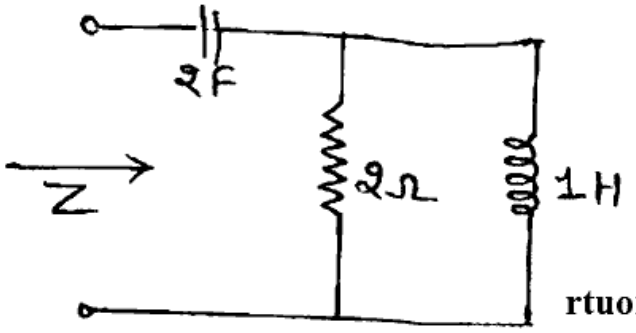
a) Series R-L

b) Series R-C circuit having sinusoidal excitation **(8)**

b) The step voltage applied to a series R-L circuit is 36 V with $R = 15\Omega$. Determine the value of inductance L required to make the current of 1.0 A at 250 μ sec. Assume the initial current is zero. **(8)**

Unit - III

3. a) Find Z(s) for the following network. **(8)**



b) Explain the relationship between pole position and stability. **(8)**

OR

3. a) Obtain the pale zero diagram of the given function and obtain the time domain response.

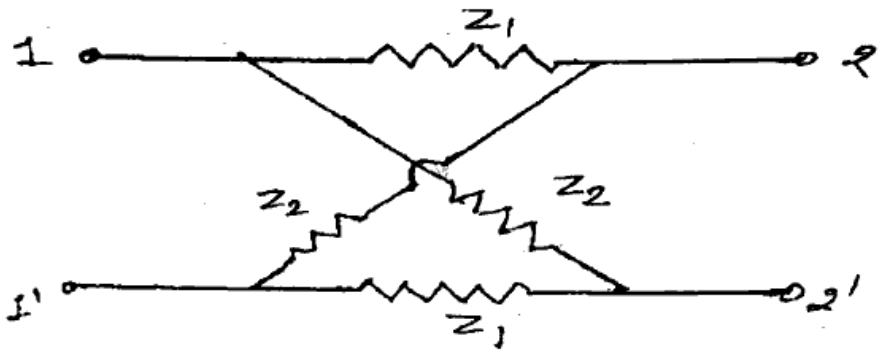
$$I(S) = \frac{2S}{(S+1)(S^2+2S+4)}$$

(8)

b) Check whether the following polynomial $P(S) = S^4 + S^3 + 2S^2 + 2S + 3$ is stable or not comment on your findings. rtuonline.com **(8)**

Unit - IV

4. a) For the lattice two port network of fig. Find the image impedance and the image transfer constant.



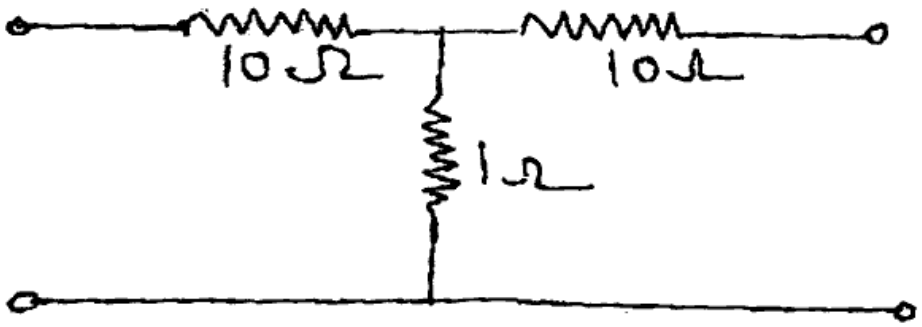
(8)

b) Derive Z-parameters in terms of hybrid parameters. **(8)**

OR

4. a) Derive the condition for reciprocity and symmetry in case of ABCD parameters. **(8)**

b) Two identical T section, as one shown in fig. are connected in cascade. Determine the Z-parameters of the combination.



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Unit - V rtuonline.com

5. An impedance is given by $Z(s) = \frac{8(S^2+1)(S^2+3)}{5(S^2+2)(S^2+4)}$ Realise the network in Foster - I, II and cauer - I, II form. **(16)**

OR

5. Realise the function $z(s) = \frac{s(s^2+4)}{2(s^2+1)(s^2+9)}$ in both the cauer and foster forms of LC networks. rtuonline.com **(16)**