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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

THIRD SEMESTER B.TECH DEGREE EXAMINATION(R&S), DECEMBER 2019

Course Code: EE201

Course Name: CIRCUITS AND NETWORKS

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries5 marks. Marks

1 State and prove maximum power transfer theorem as applied to ac circuits. (5)

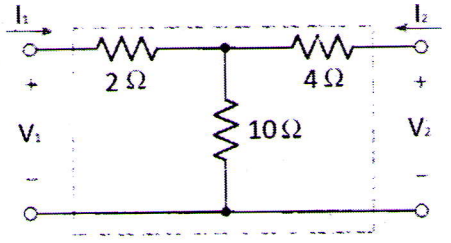
2 Find the possible number of trees of the given bus incidence. Also draw the oriented graph (5)

$$A = \begin{bmatrix} 1 & 0 & 0 & 1 \\ -1 & 1 & 1 & 0 \end{bmatrix}$$

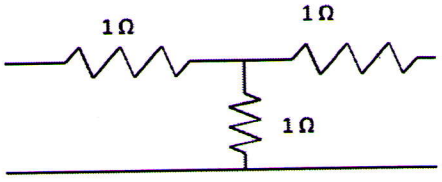
3 A series RL circuit has R = 25 Ω, and L = 5 H. A dc voltage of 100 V is applied at t = 0. Determine a) the time at which the voltage across resistor and inductor are equal and b) the current through the inductor at t = 0.5 s. (5)

4 The current through 2 Ω resistor is I(s) = $\frac{5s+3}{s^2+5s+6}$. Find the voltage across the resistor, v(t). (5)

5 Determine the transmission parameters of the network shown in figure. (5)



6 Check for symmetry and reciprocity of a two port network in z parameter representation shown in figure (5)



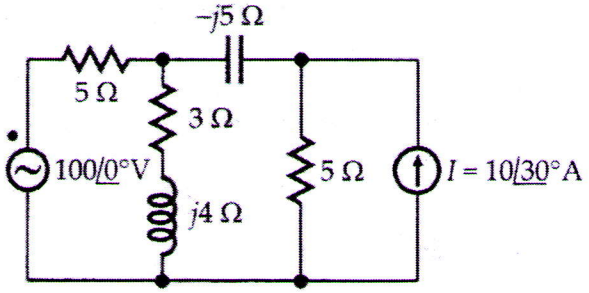
7 Explain the properties of a positive real function. (5)

8 Check whether the polynomial $s^4 + 7s^3 + 4s^2 + 18s + 6$ is Hurwitz. (5)

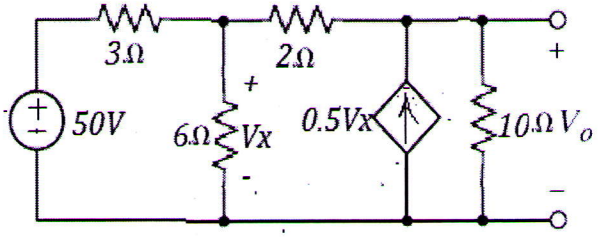
PART B

Answer any two full questions, each carries10 marks.

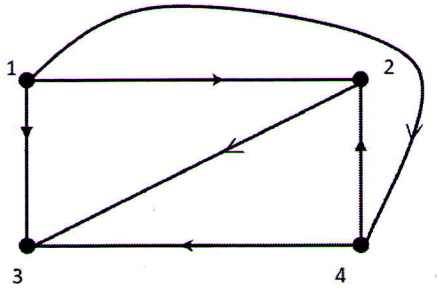
9 For the circuit shown in figure, determine the current through the capacitor, using superposition theorem, (10)



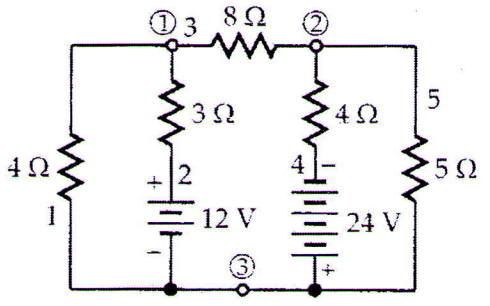
10 a) Determine the Norton equivalent circuit for the network shown in figure (5)



b) The oriented graph of a network is shown in Figure. Obtain bus incidence matrix and tie-set matrix with twigs (1-2, 2-3, and 3-4). (5)



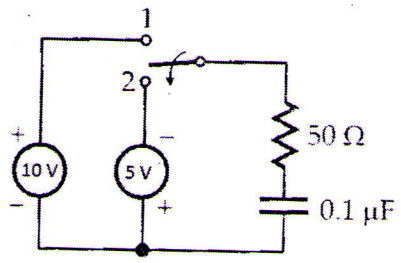
11 For the circuit shown in figure, determine all branch voltages, using cut set analysis. (10)



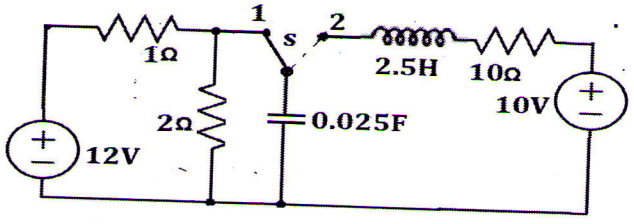
PART C

Answer any two full questions, each carries 10 marks.

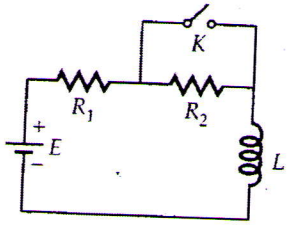
12 In the circuit shown in figure, steady state is reached, while the switch is in position 1. At t=0, the switch is moved to position 2. Determine the energy stored in the capacitor at t = 0.1 ms. (10)



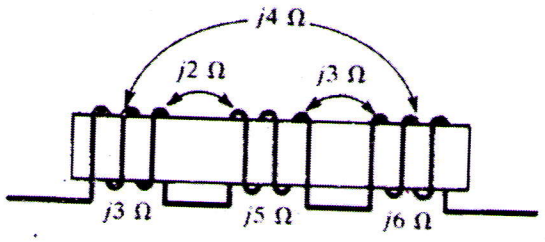
13 In the circuit shown in figure.(11) the switch S is in position 1 and the circuit attained its steady state .The switch S is transferred to position 2 at time t=0 .Determine the current through the inductor i(t) for t>0. Use s- domain approach (10)



14 a) For the circuit shown in figure, the switch was open for a long time. At t = 0, the switch is closed. Determine the current through the inductor for t > 0. Take E = 10 V, R_1 = 1Ω, R_2 = 2Ω, L = 1H. (5)



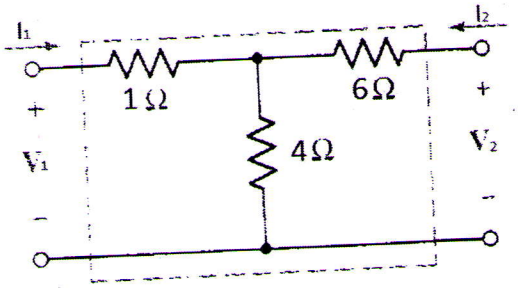
b) Obtain the dotted equivalent circuit of the network shown in figure and then determine the net inductive reactance. (5)



PART D

Answer any two full questions, each carries 10 marks.

15 a) Determine the h parameters of the two port network shown in figure. (5)



b) The Z parameters of a two port net work are Z_{11} = 10 Ω, Z_{22} = 20 Ω, $Z_{12} = Z_{21}$ = 5Ω. Determine a) The ABCD parameters of this network and b) Its equivalent T network. (5)

16 a) For a two port network, express a) z-parameters in terms of h-parameters and b) ABCD parameters in terms of y-parameters. (5)

b) Find the first Cauer form of RC network $Z(s) = \frac{(s+3)(s+6)}{(s+1)(s+5)}$ (5)

17 a) The driving point impedance of a one port LC network is given by $Z(s) = \frac{(s^2+4)(s^2+25)}{s(s^2+4)}$. Obtain the first and second Forster form of equivalent networks. (10)

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