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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

THIRD SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018

Course Code: EE201

Course Name: CIRCUITS AND NETWORKS

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 5 marks. Marks

1 State and prove Maximum Power Transfer theorem as applied to ac circuits having variable load impedance.

2 For the network shown in Fig.1 draw the oriented graph and write the (i) Incidence Matrix (ii) Tie set Matrix

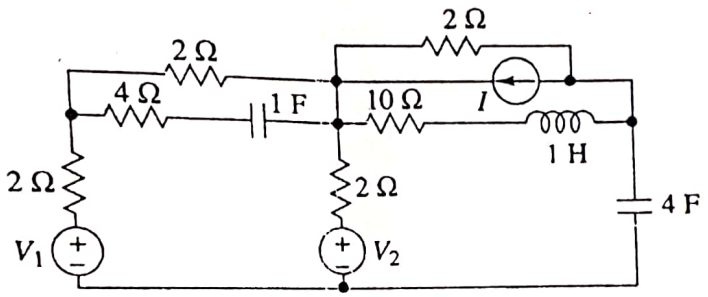

Fig. 1

3 In a series RLC circuit with R = 4Ω, L = 1H and C = 0.25F, a unit step voltage is applied at t = 0. Find the expression for the current in the circuit at t > 0.

4 The current through a 1Ω resistor in a circuit is given by the following s domain equation I(s) = $= \frac{s+2}{(s^2+2s+2)}$. Find the voltage across the resistor.

5 List the necessary conditions for a driving point function.

6 What are h- parameters? Draw the equivalent circuit of a two port network with h- parameter representation.

7 Test whether the polynomial $F(s) = s^5+3s^3+2s$ is Hurwitz.

8 Determine whether the following functions represent driving point impedance of an RC network.

(i) $Z_1(s) = \frac{s^2+5s+4}{s^2+2s}$ (ii) $Z_2(s) = \frac{2s^2+8s+6}{s^2+8s+12}$

PART B

Answer any two full questions, each carries10 marks.

9 Find the Norton's equivalent circuit across a-b for the network shown in Fig. 2 (10)

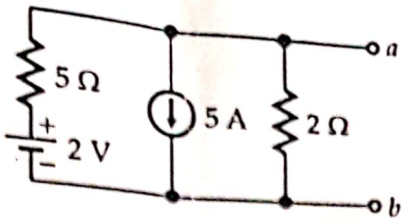

Fig.2

10 a) Find current, '*i*' in the network shown in Fig.3 using super position theorem (6)

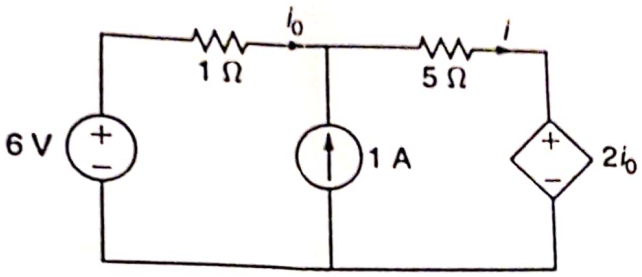

Fig.3

b) List the properties of Incidence Matrix (4)

11 For the network shown in Fig.4 write down the tieset matrix and obtain the network equilibrium equations in matrix form using KVL. Calculate the loop currents. (10)

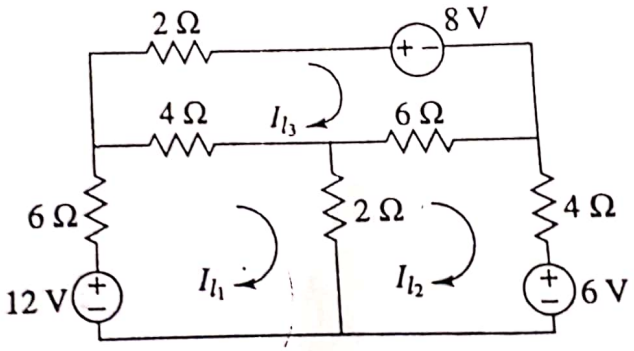

Fig.4

PART C

Answer any two full questions, each carries10 marks.

12 The switch in the circuit of Fig.5 is moved from position 1 to position 2 at t = 0. (10)

Determine $v_c(t)$.

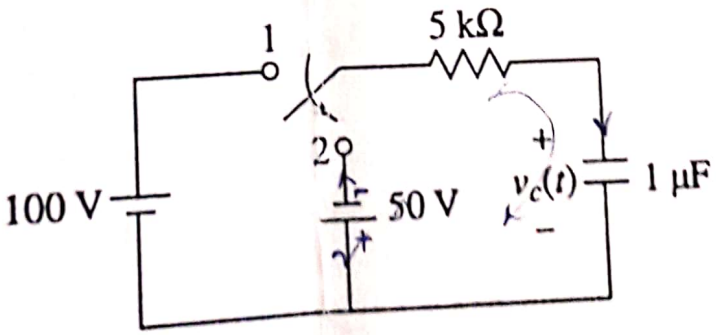

Fig.5

13 In the network shown in Fig.6 the switch is opened at $t = 0$. Find $i(0)$ (10)

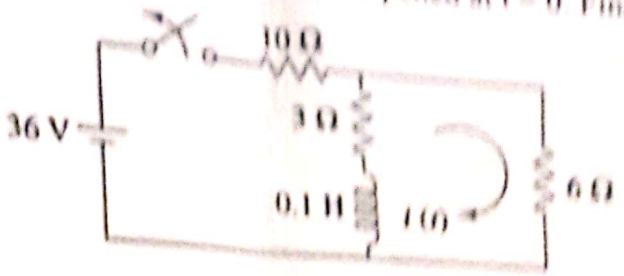

Fig.6

14 Figure.7 shows a network with mutual coupling. Find the current in the 10Ω resistance. Assume that inductors have negligible resistance (10)

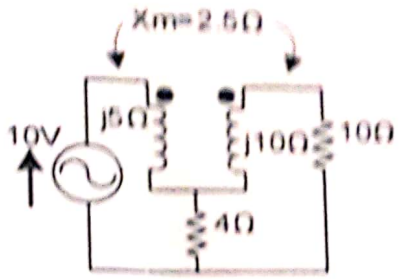

Fig.7

PART D

Answer any two full questions, each carries 10 marks.

15 a) Derive the condition for reciprocity and symmetry of Z parameters (5)

b) Find the transmission parameters for the network shown in Fig.8 (5)

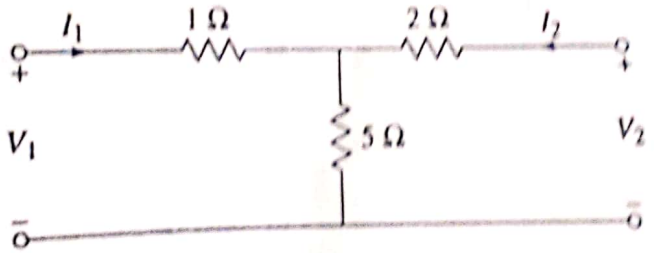

Fig.8

16 a) Show that the overall admittance parameter matrix for parallel connected two port network is the sum of admittance parameters of each individual two port network in parallel (5)

b) Synthesize the network function $Z(s) = \frac{(s^2+1)}{s(s^2+2)}$ in Foster I form. (5)

17 Find the Cauer I and II forms of the RL impedance function $Z(s) = \frac{2(s+1)(s+3)}{(s+2)(s+6)}$ (10)

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