Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

THIRD SEMESTER B.TECH DEGREE EXAMINATION, APRIL 2018

Course Code: EE201

Course Name: CIRCUITS AND NETWORKS (EE)

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 5 marks Marks

1 Stat and explain reciprocity theorem. (5)

2 Write down the properties of incidence matrix. (5)

3 If an RLC series circuit is energised by a 10V DC source at t=0 sec. Draw the expected graph of the following circuit variables under different damping conditions: (5)

i) The current through the circuit ii) Voltage across the capacitor.

4 Find the current through circuit shown in Fig. 1. (5)

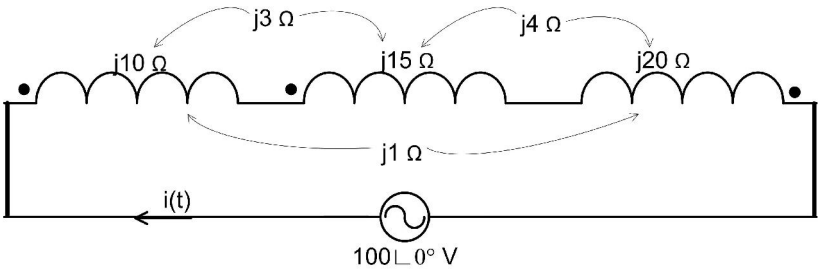

Figure 1

5 Derive the condition for symmetry and reciprocity of Y-parameters. (5)

6 What is h-parameters? Why they are called hybrid parameters? (5)

7 What is the differentiate between network analysis and synthesis. (5)

8 State the properties of LC driving point immittance function. (5)

PART B

Answer any two full questions, each carries 10 marks

9 For the circuit shown in Fig. 2 find the value of R_L that absorbs maximum power from the circuit and the corresponding power under this condition. (10)

10 For the network shown in Fig. 3, draw the oriented graph, write the tie-set schedule and hence obtain the equilibrium equations on loop basis. Calculate the values of branch current and branch voltages. (10)

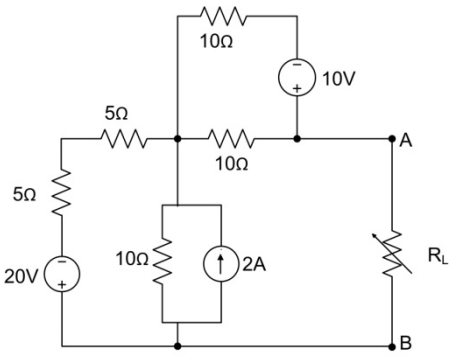

Figure 2

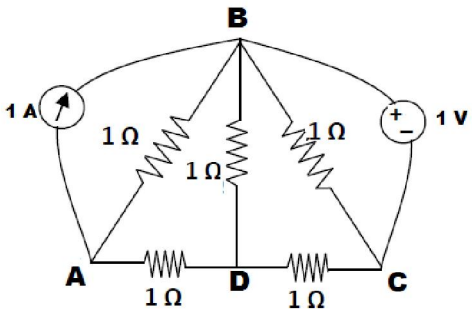

Figure 3

11 (a) Draw the Norton's equivalent circuit and Thevenin's equivalentcircuit of Fig. 4. (5)

(b) Obtain basic cutset matrix for the oriented graph shown in Fig. 5. Take 1,2,3 as twigs. (5)

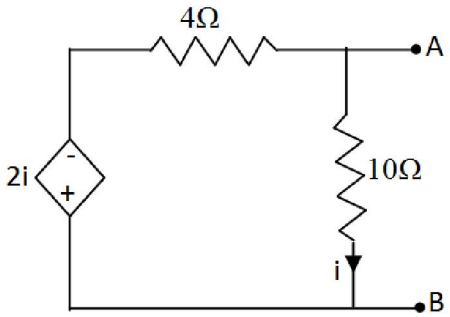

Figure 4

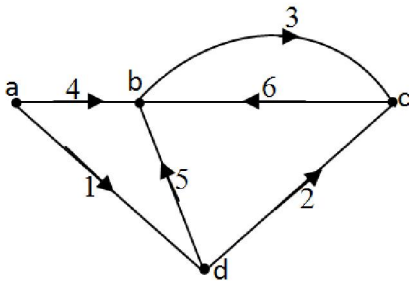

Figure 5

PART C

Answer any two full questions, each carries 10 marks

12 For the circuit shown in Fig.6 , the DPDT switch at position 2 for a long time. At t=0 sec. contact is moved from position 2 to 1 andat t= 10 sec. the contact is moved from 1 to 2. Derive a expression for the $i_C(t)$ and $v_C(t)$ in both cases. Plot variation of $i_C(t)$ and $v_C(t)$. (10)

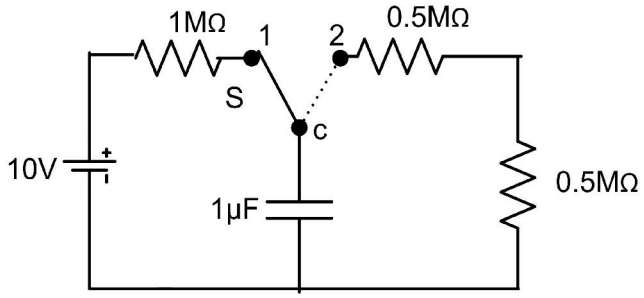

Figure 6

13 Find the expression for the current through the inductor $i_L(t)$ in a parallel RLC (three branch) circuit when a step input of I amperes is applied across it at time t = 0. Assume all initial conditions are zero. Apply Laplace transform technique. (10)

14 The switch S in the circuit of Fig. 7 is in the closed position for long time. At t=0, the switch opens. Find the expression for the current using Laplace transform. (10)

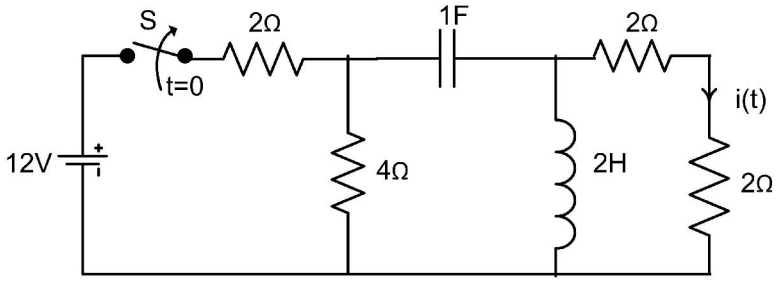

Figure 7

PART D

Answer any twofull questions, each carries 10 marks

15 Obtain the z parameters for the network in Fig. 8 as functions of s. (10)

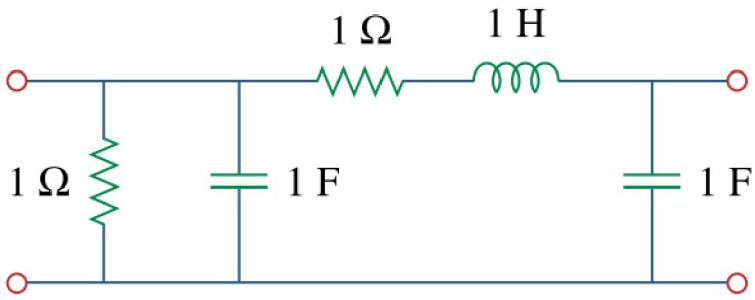

Figure 8

16 a) The Z- parameters of a two port network are Z_{11}= 10Ω, Z_{22}=15Ω, $Z_{12}=Z_{21}$=5Ω. Find the equivalent T-network and ABCD parameters (6)

b) Test whether the polynomial $P(s)=s^4+s^3+3s^2+2s+12$ is Hurwitz (4)

17 a) Point out the difference in the philosophy between Foster and Cauer form of synthesis of a given driving point impedance (4)

b) The driving point impedance of a circuit is (6)

$$Z(s) = \frac{2(s^2+1)(s^2+3)}{s(s^2+2)}$$

Realize the given impedance function Z(s)as a Cauer's first form.

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