USN

10ES34

Third Semester B.E. Degree Examination, June/July 2013
Network Analysis

Time: 3 hrs. Max. Marks:100

Note: *1. Answer FIVE full questions, selecting atleast TWO questions from each part.*
2. Missing data, if any, may be suitable assumed.

PART – A

1 a. Find the voltage across resistance R in the networking Fig. Q1(a) by mesh analysis. **(08 Marks)**

b. For the network of Fig. Q1(b) determine the node voltage by nodal analysis. **(06 Marks)**

c. Determine V_{23} by mesh analysis in the network of Fig. Q1(c). **(06 Marks)**

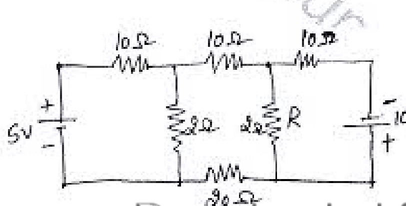

Fig. Q1(a)

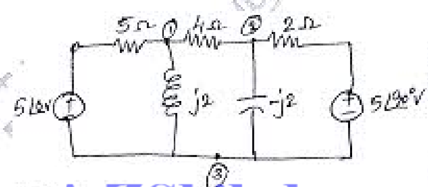

Fig. Q1(b)

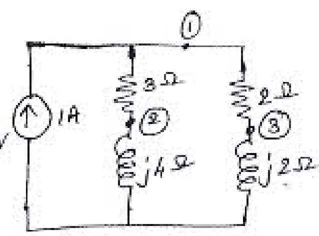

Fig. Q1(c)

2 a. Solve for loop and branch currents for the circuit of Fig. Q2(a) using tie set schedule and network equilibrium equations on the loop basis. Take OA, OB and OC as tree branches. **(10 Marks)**

b. Write the f-cut set matrix and solve for tree branch voltages. Take OA, OB and OC as the tree branches for the network of Fig. Q2(b). **(06 Marks)**

c. Draw the dual of the network of Fig. Q2(c). **(04 Marks)**

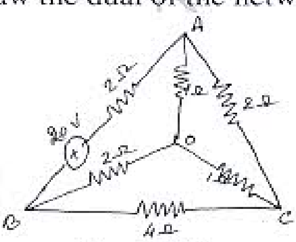

Fig. Q2(a)

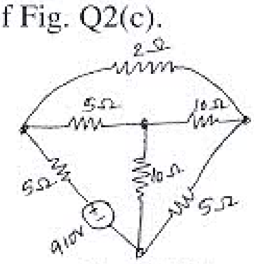

Fig. Q2(b)

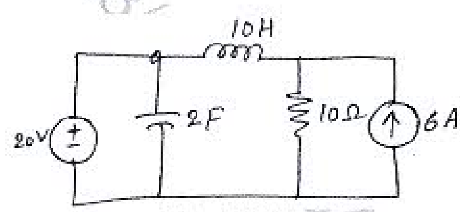

Fig. Q2(c)

3 a. State and explain super position theorem. **(06 Marks)**

b. Find the load current I in the circuit of Fig. Q3(b) by using Millman's theorem. **(06 Marks)**

c. Verify reciprocity theorem for the network of Fig. Q3(c) with response I_3. **(08 Marks)**

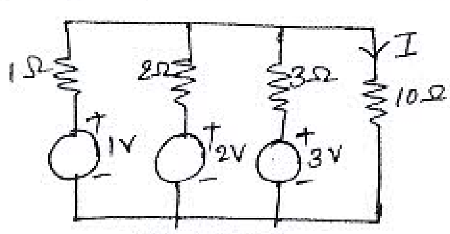

Fig. Q3(b)

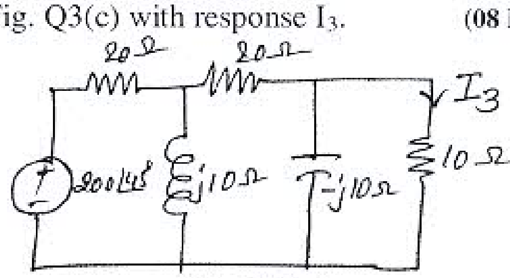

Fig. Q3(c)

4 a. State and explain Thevenin's theorem. (07 Marks)

b. Obtain Norton equivalent of the network of Fig. Q4(b) between terminals A and B. (07 Marks)

c. Find the value of Z_L for maximum power transfer through Z_L in the network of Fig. Q4(c). (06 Marks)

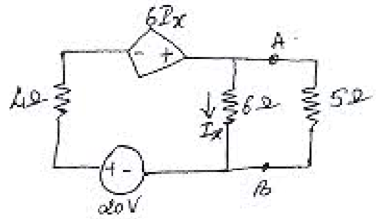

Fig. Q4(b)

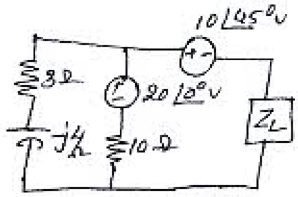

Fig. Q4(c)

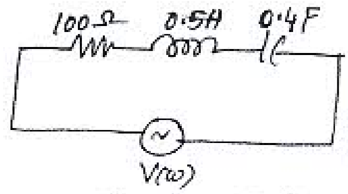

Fig. Q5(a)

PART – B

5 a. For the series RLC circuit of Fig. Q5(a) find the resonant frequency, half power frequencies, band width and quality factor. (10 Marks)

b. Derive expression for f_r, Q and bandwidth of a parallel resonant circuit with lossless capacitor in parallel with a coil of resistance R and inductance L. (10 Marks)

6 a. In the circuit of Fig. Q6(a), switch K is changed from position 1 to 2 at t = 0, steady state condition having reached before switching. Find i, $\frac{di}{dt}$ and $\frac{d^2i}{dt^2}$ at $t = 0^+$. (08 Marks)

b. In the circuit of Fig. Q6(b), switch k is opened at t = 0. Find the values of v, $\frac{dv}{dt}$ and $\frac{d^2v}{dt^2}$ at $t = 0^+$. (06 Marks)

c. In the circuit of Fig. Q6(c) switch k is closed at t = 0. Find the value of v_1, v_2 and v_3 at $t = 0^+$. The circuit is initially relaxed. (06 Marks)

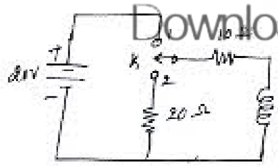

Fig. Q6(a)

Fig. Q6(b)

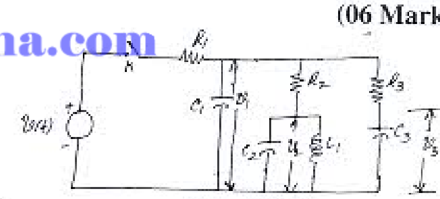

Fig. Q6(c)

7 a. Using Laplace transform obtain an expression for the current i(t) in the network of Fig. Q7(a). Assume zero critical conditions. (06 Marks)

b. For the critically related network of Fig. Q7(b) obtain expression for the current i(t). Use Laplace transform. (06 Marks)

c. Determine the Laplace transform of the periodic saw tooth waveform of Fig. Q7(c). Use gate function. (08 Marks)

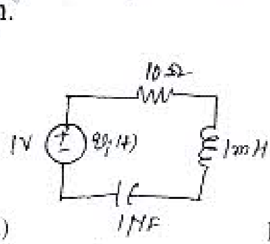

Fig. Q7(a)

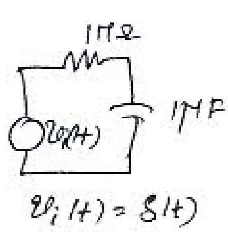

Fig. Q7(b)

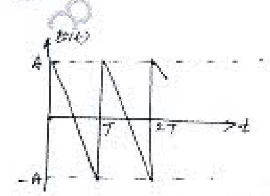

Fig. Q7(c)

8 a. For the network of Fig. Q8(a) obtain the Z – parameters. Also draw the Z – parameter equivalent circuit. (12 Marks)

b. Determine the transmission parameters of the network of Fig. Q8(b). (08 Marks)

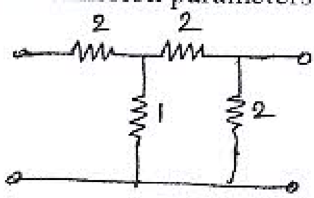

Fig. Q8(a)

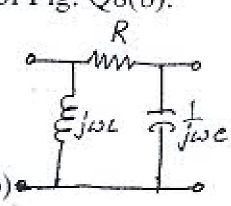

Fig. Q8(b)

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