2002 SCHEME

USN | | | | | | | | | | |

EE34

Dec'09 - Jan'10

Third Semester B.E. Degree Examination, ~~June-July 2009~~

Network Analysis

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions.***

1 a. Using mesh analysis determine the current through the 10V battery for the circuit shown in Fig.1(a). **(06 Marks)**

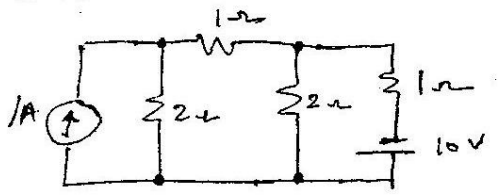

Fig.1(a).

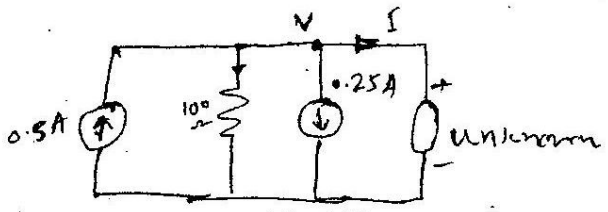

Fig.1(b)

b. Find V, I and the power absorbed by the unknown element if 0.5A source supplies 1 Watt to the circuit shown in Fig.1(b) **(06 Marks)**

c. Derive the formula for star to delta conversion. Explain its application with an example. **(08 Marks)**

2 a. With the help of an example, explain the following for a network graph.
i) Complete incidence matrix ii) Reduced incidence matrix
iii) Tic set schedule iv) Cut set schedule. **(10 Marks)**

b. For the network shown in Fig.2(b), determine the number of branches, number of nodes and number of links. Write down the incidence matrix and also develop equilibrium equations in matrix form. **(10 Marks)**

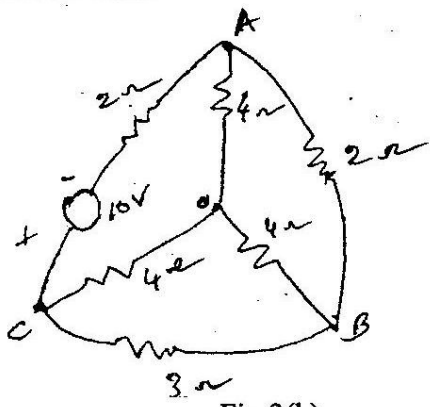

Fig.2(b)

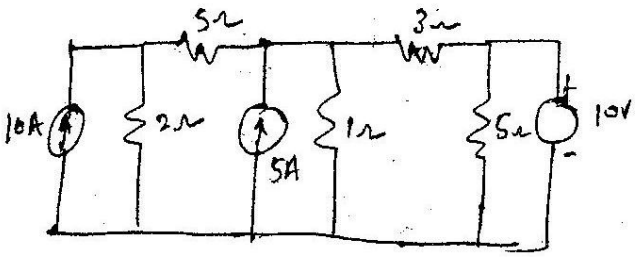

Fig.3(b)

3 a. State and explain Thevenin's theorem. **(08 Marks)**

b. Find the current in the 3Ω resistor for the circuit shown in Fig.3(b) using Thevenin's theorem. **(12 Marks)**

4 a. State and explain Norton's theorem using suitable example. **(08 Marks)**

b. Find the value of z_L to have maximum power transfer from $10\angle 0^\circ$ voltage source. Also, determine the amount of maximum power delivered to the load in the circuit shown in Fig.4(b). **(12 Marks)**

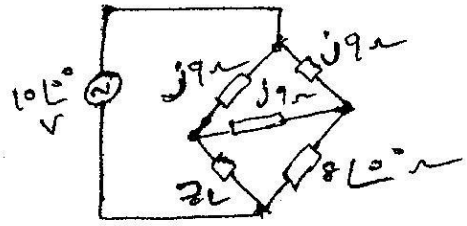

Fig.4(b)

5 a. Explain the following terms with reference to a resonant circuit:
i) Quality factor ii) Band width iii) Selectivity curve. **(06 Marks)**

b. A series RLC circuit consists of a resistance of 1KΩ and an inductance of 100 mH in series with a capacitance of 10PF. If 100V ac is applied as input across the circuit, determine
i) the resonant frequency ii) the maximum current in the cicuit
iii) Q factor of the circuit. iii) the half power frequency. **(08 Marks)**

c. A 400V, 50Hz supply feeds energy to a parallel circuit of a $10\angle 30^\circ$ ohm branch and a $10\angle 60^\circ$ ohm branch. Determine the impedance of a circuit element that if connected in series with the source, the system comes at resonance. **(06 Marks)**

6 a. What is the significance of initial conditions? Write a note on initial conditions in basic circuit elements R, L & C. **(10 Marks)**

b. For the network shown in Fig.6(b) find i_1, i_2, $\frac{di_1}{dt}, \frac{di_2}{dt}, \frac{d^2i_2}{dt^2}$ at t = O+. The circuit was in steady state before the closure of the switch. Assume all initial conditions zero. **(10 Marks)**

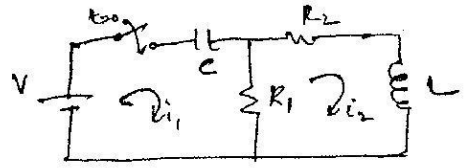

Fig.6(b)

7 a. Find the Laplace Transform of the waveform shown in Fig.7(a) **(06 Marks)**

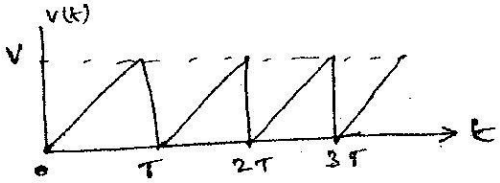

Fig.7(a)

b. Find the inverse Laplace Transform of the following function using convolution integral

$$I(s) = \frac{s}{(s^2 + a^2)^2}.$$ **(06 Marks)**

c. Find the Laplace transform of i) δ(t) ii) u(t) iii) e^{-at}Sinh wt. **(08 Marks)**

8 a. Determine the h – parameters for the network shown in Fig.8(a) **(08 Marks)**

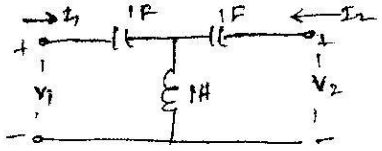

Fig.8(a)

b. Obtain the relationship between 'h' and 'y' parameters of a two part network. **(08 Marks)**

c. Write a note on the application of ABCD parameters. **(04 Marks)**

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