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06ES34

Third Semester B.E. Degree Examination, Dec.08/Jan.09
Network Analysis

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Explain the node method of analysis. **(04 Marks)**

b. Determine the current through load resistor, R for the network shown in Fig.1(b), using mesh method. **(06 Marks)**

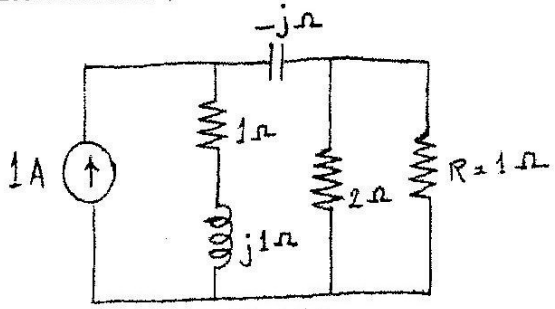

Fig.1(b)

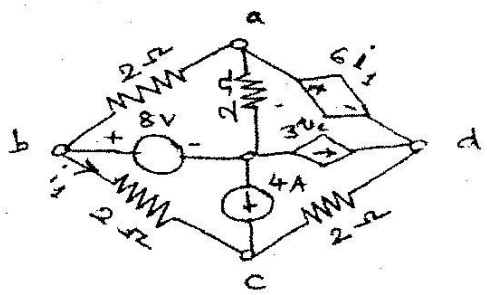

Fig.1(c)

c. For the network shown in Fig.1(c), find the node voltages v_d & v_c. **(10 Marks)**

2 a. Define the following and give one example of each:
(i) Network graph (ii) Tree (iii) Tie set (iv) Cut set. **(06 Marks)**

b. For the circuit diagram shown in Fig.2(b), write the f-cut set matrix & hence obtain the equilibrium equation on node basis & obtain tree branch voltages. Take tree of the graph containing branches (1) & (3) and same orientation as shown in figure. **(14 Marks)**

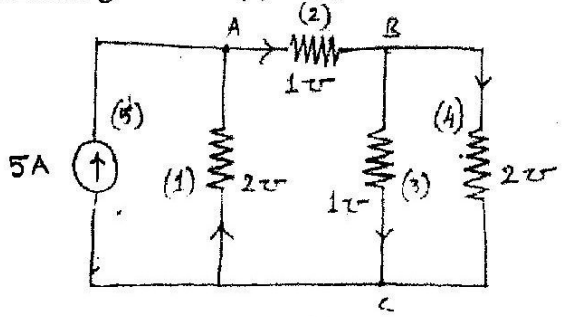

Fig.2(b)

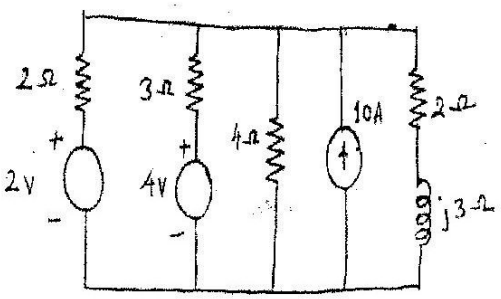

Fig.4(c)

3 a. State the superposition theorem. **(02 Marks)**

b. State and prove the reciprocity theorem. **(06 Marks)**

c. A source of 100V feeds a load impedance Z_L through a series impedance $Z_s = (25 + j40)\Omega$.
(i) Determine the load impedance for maximum power transfer & the value of the max. power. (ii) If the load consists of a purely resistance R_L, find the value of R_L for which the maximum power is transferred & max. power transfer. **(12 Marks)**

4 a. State the Norton's theorem. **(02 Marks)**

b. State & prove Thevenin's theorem. **(06 Marks)**

c. Use Millman's theorem to find current flowing through $(2 + j3)\Omega$ impedance, for circuit given in Fig.4(c). **(12 Marks)**

PART – B

5 a. Define the following terms: **(04 Marks)**
(i) Resonance (ii) Selectivity (iii) B. W. (iv) Q-factor.

b. Derive the expression for a resonant frequency for a parallel circuit having R in series with L only. **(06 Marks)**

c. Two coils; one of R_1=0.51Ω, L_1= 32mH & other coil of R_2=1.3Ω, L_2= 15mH are in series and are in series with a capacitor of 25 μF & 62 μF and a series resistor of resistance 0.24 Ω. Determine the following:
(i) Resonant frequency (ii) Q-factor of the circuit (iii) B.W.
(iv) Power dissipated in the circuit at resonant frequency **(10 Marks)**

6 a. For the network shown in Fig.6(a), the switch is moved from position 1 to position 2 at t=0 the steady state has been reached before switching. Calculate i, di/dt, d^2i/dt^2 at $t=0^+$ **(10 Marks)**

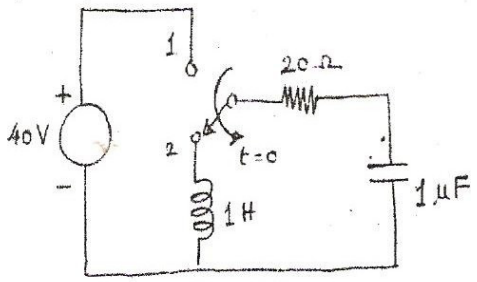

Fig.6(a)

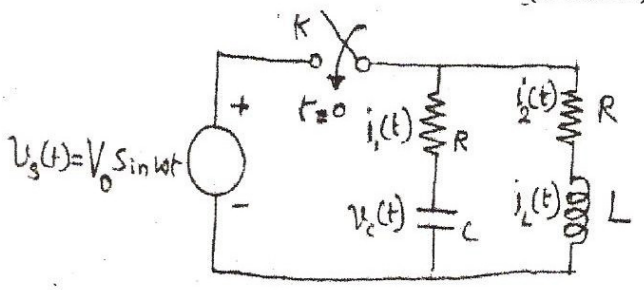

Fig.6(b)

b. For the network shown in Fig.6(b), find out $\frac{di_1(o^+)}{dt}$ & $\frac{di_2(o^+)}{dt}$ when the switch K is closed at t=0. Assume the circuit was not activated before t=0. **(10 Marks)**

7 a. Define the impulse function & obtain its L.T. **(04 Marks)**

b. For a series RL circuit shown in Fig.7(b), the switch K is closed at time t=0, find the current i(t) using Laplace transform. **(06 Marks)**

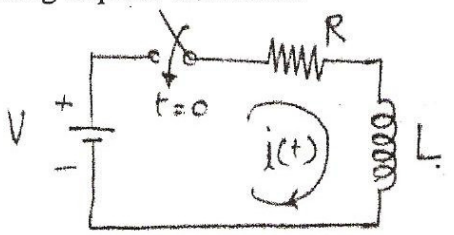

Fig.7(b)

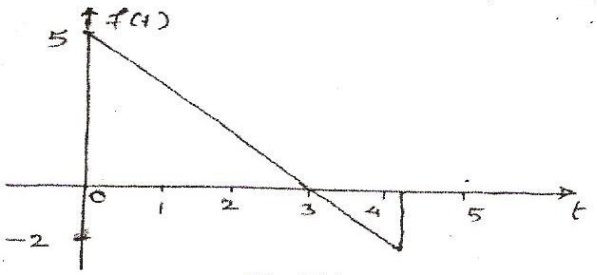

Fig.7(c)

c. Obtain the Laplace transform of F(t) for the waveform shown in Fig.7(c). **(10 Marks)**

8 a. Define Z-parameters. **(04 Marks)**

b. Obtain the relationship between T & h parameters i.e. T parameters in terms of h parameters. **(06 Marks)**

c. Obtain the Y-parameters of the two port network shown in Fig.8(c). **(10 Marks)**

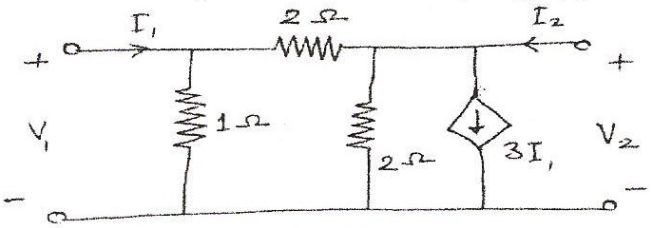

Fig.8(c)

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