EE34

USN

NEW SCHEME

Third Semester B.E. Degree Examination, Dec. 06 / Jan. 07
EE / TC / EC / IT / BM / ML
Network Analysis

Time: 3 hrs.] [Max. Marks:100

Note : *Answer any FIVE full questions.*

1 a. Derive expression for i) Y to Δ and ii) Δ to Y transformations. **(10 Marks)**

b. In the circuit of Fig.1(b), find I through loop analysis

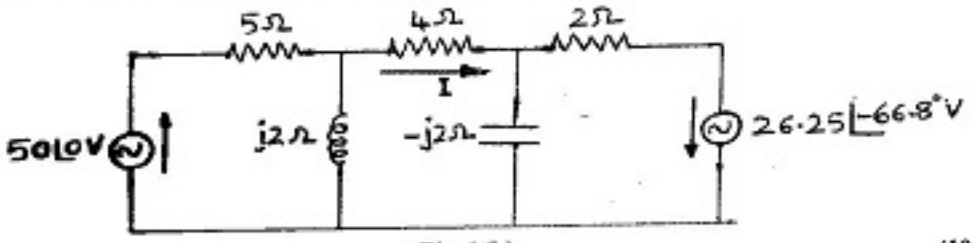

Fig.1(b) **(10 Marks)**

2 a. Define with examples

i) Oriented graph ii) Tree iii) Fundamental cut set iv) Fundamental tie set **(08 Marks)**

b. In the circuit of Fig.2(b) the ohmic values also represent the branch numbers. Form a tree using 4 Ω, 5 Ω, and 6 Ω branches and find the branch currents using cut set matrix.

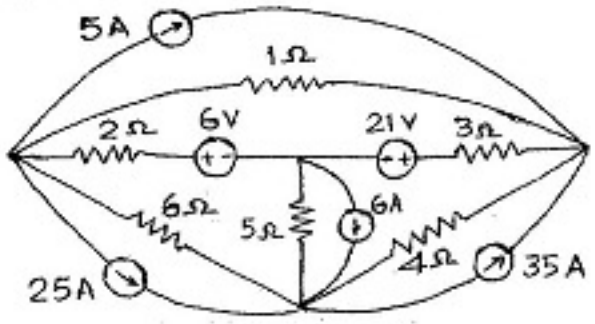

Fig.2(b) **(12 Marks)**

3 a. State and prove maximum power transfer theorem for AC circuits. **(08 Marks)**

b. In the circuit of Fig.3(b) obtain I by Thevenin's theorem.

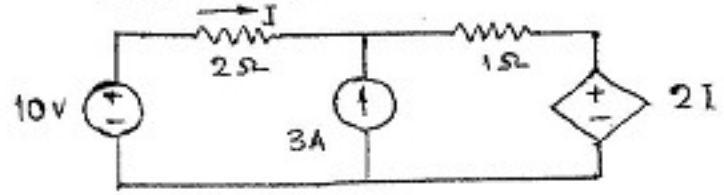

Fig.3(b) **(12 Marks)**

4 a. Define i) Bandwidth ii) Selectivity.
Derive an expression for bandwidth. **(08 Marks)**

b. A coil is connected in series with a variable capacitor across $v(t) = 10 \cos 1000t$. The capacitor is varied and the current is maximum when $C = 10\ \mu F$. When $C = 12.5\ \mu F$, the current is 0.707 times the maximum value. Find L, R and Q of the coil. **(12 Marks)**

Contd.... 2

5 a. In the circuit of Fig.5(a) switch K is charged from 1 to 2 at t = 0, steady state having been attained in position 1. Find the values of i, $\frac{di}{dt}$ and $\frac{d^2i}{dt^2}$ at t = 0. **(10 Marks)**

b. In the circuit of Fig.5(b), switch K is kept open for a very long time. On closing K, after 10 ms, V_c = 80 V. Then the switch K is kept closed for a long time. When the switch is opened again, V_c = 90 V after half second. Calculate values of R and C. **(10 Marks)**

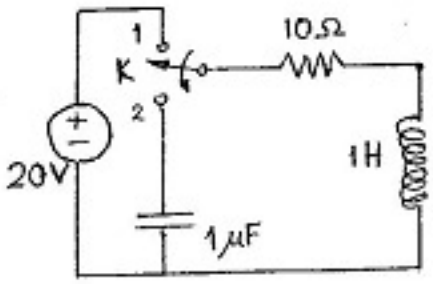

Fig.5(a)

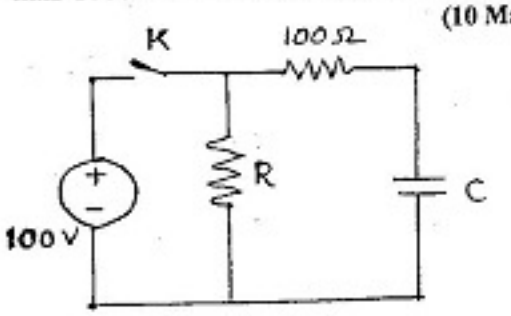

Fig.5(b)

6 a. In the circuit of Fig.6(a), the source voltage is V(t) = 50 sin 250t. Using Laplace transforms, determine the current when switch K is closed at t = 0. **(10 Marks)**

b. In the circuit of Fig.6(b), the switch is closed at t = 0. Derive an expression for V(t) after the switch closes. **(10 Marks)**

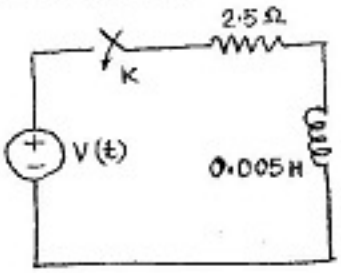

Fig.6(a)

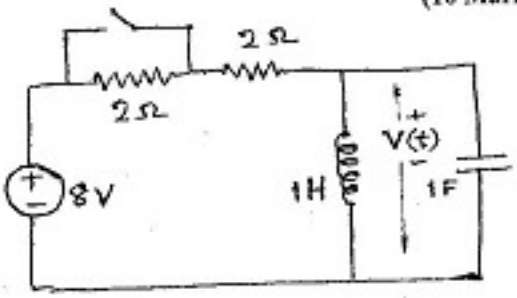

Fig.6(b)

7 a. Derive the Z-parameters in terms of Y parameters. **(08 Marks)**

b. Find the Y-parameters for the circuit shown in Fig.7(b). Then use the parameter relationship to find the ABCD parameters.

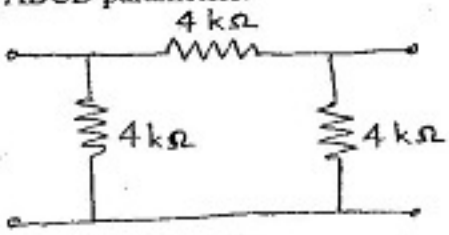

Fig.7(b)

(12 Marks)

8 a. Construct the dual of the network shown in Fig.8(a). **(10 Marks)**

b. What should be the value of a pure resistance to be connected across the terminals a and b in the circuit of Fig.8(b), so that max power is transferred to the load. What is the max power? **(10 Marks)**

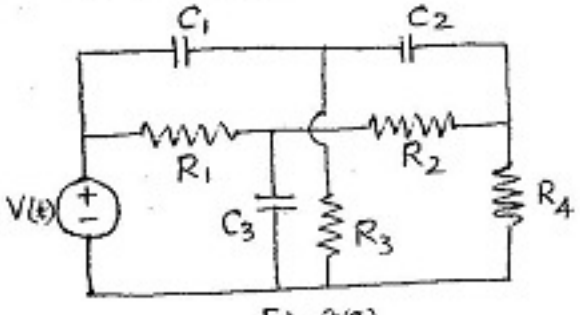

Fig 8(a)

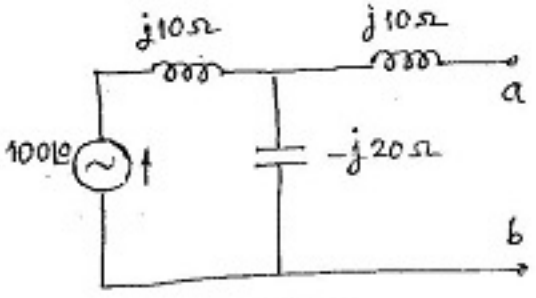

Fig 8 b

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