CBCS SCHEME

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17EC35

Third Semester B.E. Degree Examination, Feb./Mar. 2022
Network Analysis

Time: 3 hrs. Max. Marks: 100

Note: *Answer any FIVE full questions, choosing ONE full question from each module.*

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-1

1 a. Derive expression for Delta to star network. **(06 Marks)**

b. Find the power delivered by the 5A current source in the network shown in Fig.Q1(b), using node analysis.

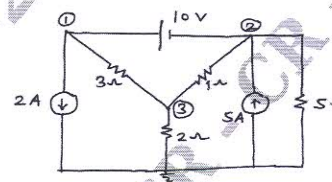

Fig.Q1(b) **(07 Marks)**

c. Determine the current through 6Ω resistance shown in Fig.Q1(c), using loop analysis.

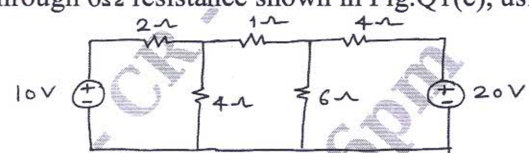

Fig.Q1(c) **(07 Marks)**

OR

2 a. For the networks shown in Fig.Q2(a), determine the voltage V using source shift and /or source transformation techniques only.

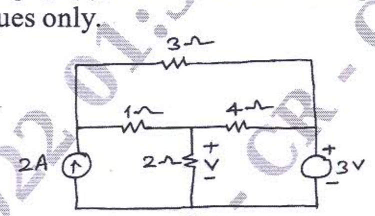

Fig.Q2(a) **(06 Marks)**

b. Use mesh current method to find the power delivered by the dependent voltage source in the network shown in Fig.Q2(b).

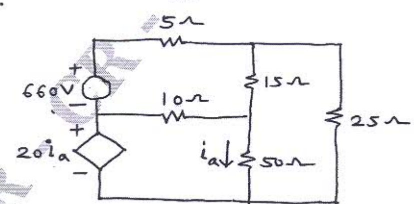

Fig.Q2(b) **(07 Marks)**

c. Find the value of V such that current through 4Ω resistance is zero, using nodal analysis for the circuit shown in Fig.Q2(c).

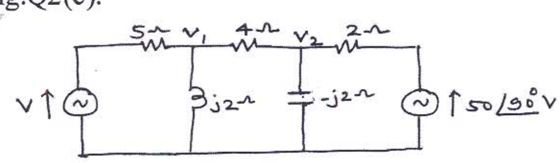

Fig.Q2(c) **(07 Marks)**

Module-2

3 a. State and prove Reciprocity theorem. **(06 Marks)**

b. Find the Thevenin's equivalent for the circuit shown in Fig.Q3(b) with respect to terminals a – b.

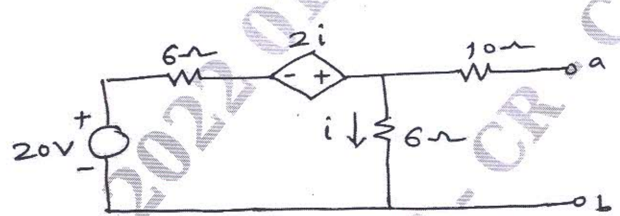

Fig.Q3(b) **(07 Marks)**

c. State Millman's theorem. Using the same calculate the current through load R_L in the circuit shown in Fig.Q3(c).

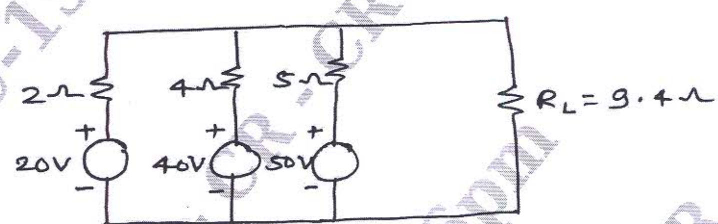

Fig.Q3(c) **(07 Marks)**

OR

4 a. State and prove maximum power transfer theorem. **(06 Marks)**

b. Find I_x for the circuit shown in Fig.Q4(b) using superposition theorem.

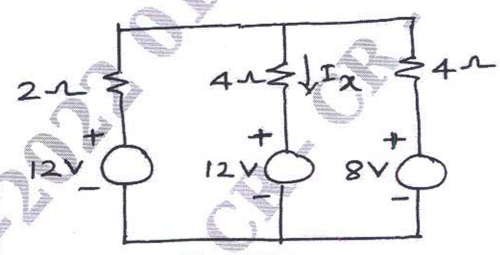

Fig.Q4(b) **(07 Marks)**

c. Determine the current through 1Ω resistance connected between X, Y of the network shown in Fig.Q4(c) using Norton's theorem.

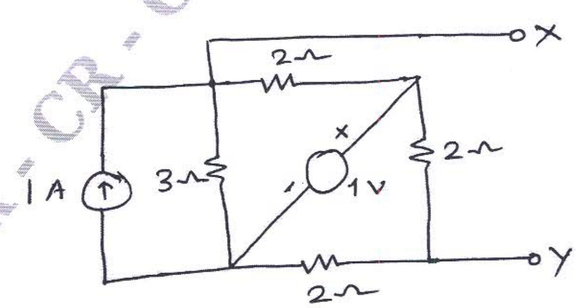

Fig.Q4(c) **(07 Marks)**

Module-3

5 a. In the network shown in Fig.Q5(a), the switch is closed at $t = 0$. Determine i, $\frac{di}{dt}$ and $\frac{d^2i}{dt^2}$ at $t = 0^+$.

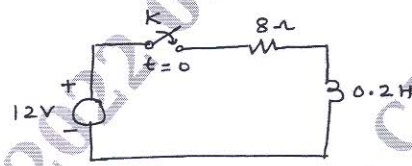

Fig.Q5(a) **(10 Marks)**

b. Determine the Laplace transform of the waveform shown in Fig.Q5(b).

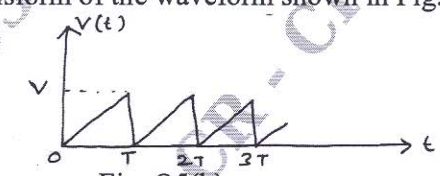

Fig. Q5(b) **(10 Marks)**

OR

6 a. In the network shown in Fig.Q6(a), the switch is moved from position 1 to position 2 at $t = 0$. The steady state has been reached before switching, calculate :

i, $\frac{di}{dt}$ and $\frac{d^2i}{dt^2}$ at $t = 0^+$.

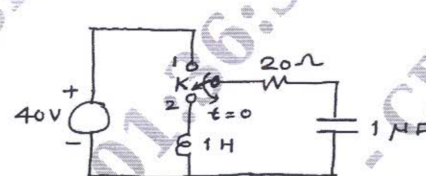

Fig.Q6(a) **(10 Marks)**

b. Obtain the Laplace transform of the square wave train shown in Fig.Q6(b).

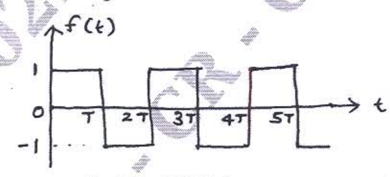

Fig.Q6(b) **(10 Marks)**

Module-4

7 a. Derive expression for frequency at which voltage across the capacitor is maximum. **(07 Marks)**

b. For the circuit shown in Fig.Q7(b), find for what value of R_C the circuit resonates.

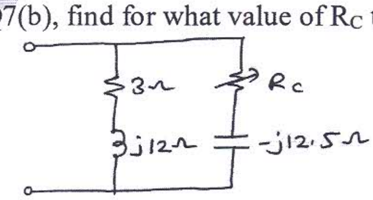

Fig.Q7(b) **(07 Marks)**

c. A series RLC circuit has R = 10Ω, L = 0.01H and C = 0.01 μF and it is connected across 10mV supply. Calculate : i) f_0 ii) Q_0 iii) Band width. **(06 Marks)**

OR

8 a. Derive an expression for resonant frequency of parallel resonant circuit. **(7 Marks)**

b. A series RLC circuit has a quality factor of 5 at 50r/sec. The current flowing through the circuit at resonance is 10A and the supply voltage is 100V. The total impedance of the circuit is 20Ω. Find the circuit constants. **(06 Marks)**

c. Find the value of L at which the circuit resonates at a frequency of 1000 r/sec in the circuit shown in Fig.Q8(c).

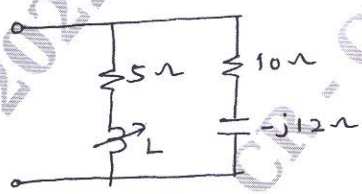

Fig.Q8(C) **(07 Marks)**

Module-5

9 a. Express Z parameters in terms of Y parameters and h parameters. **(10 Marks)**

b. Determine the z parameters of the network shown in Fig.Q9(b).

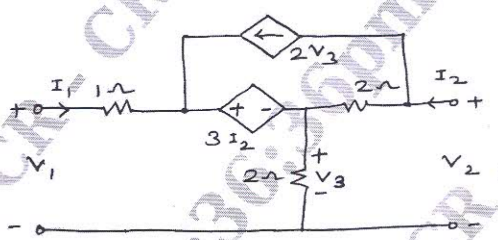

Fig.Q9(b) **(10 Marks)**

OR

10 a. Express Y parameters in terms of Z parameters and ABCD parameters. **(10 Marks)**

b. Find the h parameters of the network shown in Fig.Q10(b) and draw the h parameter equivalent circuit.

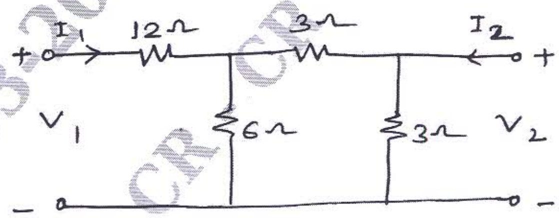

Fig.Q10(b) **(10 Marks)**

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