CBCS SCHEME

USN | | | | | | | | | |

15EC34

Third Semester B.E. Degree Examination, July/August 2022
Network Analysis

Time: 3 hrs. Max. Marks: 80

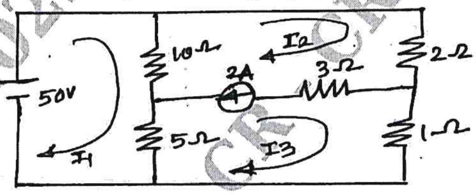
Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

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

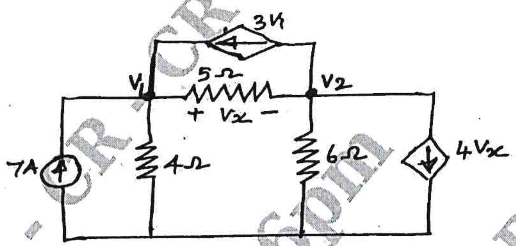
1 a. Find the current 'I' in 5Ω using Mesh analysis for Fig. Q1(a). **(08 Marks)**

Fig. Q1(a)



b. Find the voltage V_x using Node Analysis for Fig. Q1(b). **(08 Marks)**

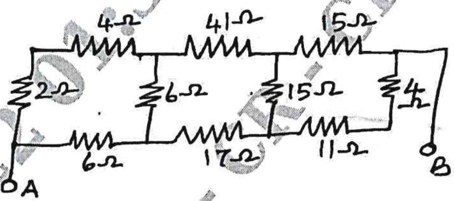
Fig. Q1(b)



OR

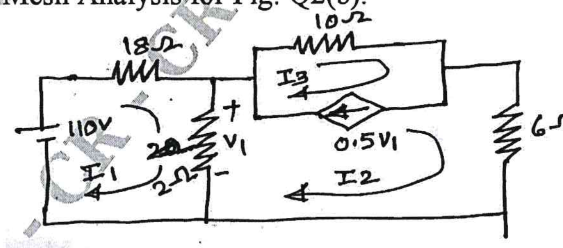
2 a. Determine the resistance between A and B using Δ to Y conversion for Fig. Q2(a). **(04 Marks)**

Fig. Q2(a)



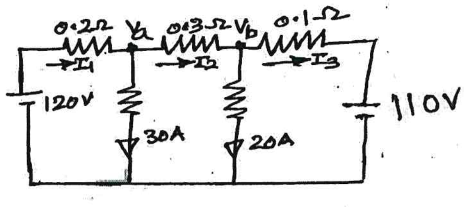
b. Find the current I_1 , I_2 using Mesh Analysis for Fig. Q2(b). **(06 Marks)**

Fig. Q2(b)



c. Calculate I_1 , I_2 , I_3 , V_a , V_b using Node analysis for Fig. Q2(c). **(06 Marks)**

Fig. Q2(c)



Module-2

3 a. State and prove Thevenin's theorem. **(05 Marks)**

b. Find I_x using Super position theorem for Fig. Q3(b). **(05 Marks)**

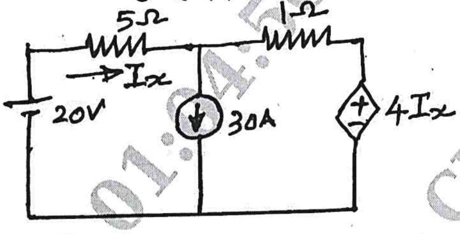


Fig. Q3 (b)

c. Verify the Reciprocity theorem for the circuit in Fig. Q3(c). **(06 Marks)**

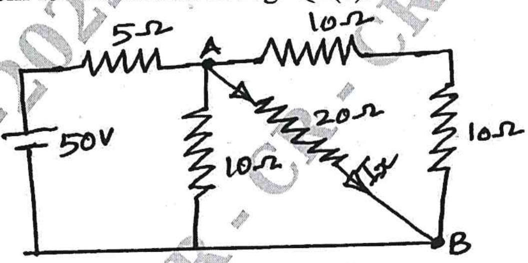


Fig. Q3 (c)

OR

4 a. State and prove Milliman's theorem. **(05 Marks)**

b. Determine I through 8Ω using Norton's theorem for Fig. Q4(b). **(05 Marks)**

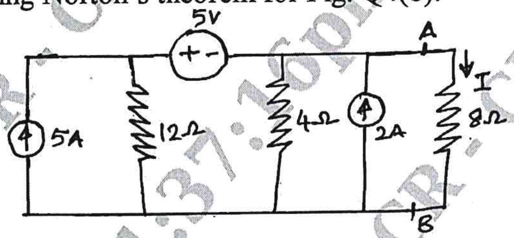


Fig. Q4 (b)

c. Find the value of R_L and Maxi Power delivered to R_L using Maxi Power theorem for Fig. Q4(c). **(06 Marks)**

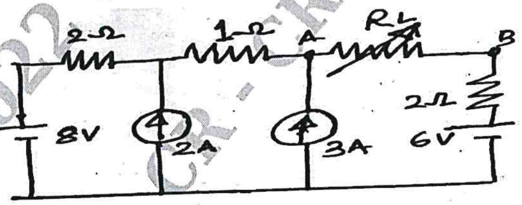


Fig. Q4 (c)

Module-3

5 a. S – opened at t = 0 for the circuit Fig. Q5(a). Calculate $V(0^+)$ $\frac{dv(0^+)}{dt}$, $\frac{d^2v(0^+)}{dt^2}$. **(05 Marks)**

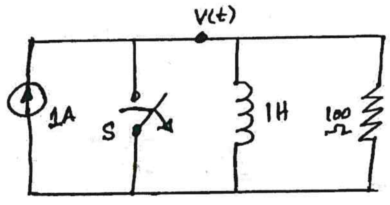
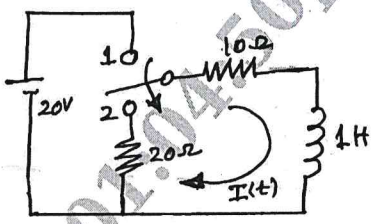


Fig. Q5(a)

b. S – is moved from 1 to 2 at t = 0 find $I(0^+)$, $\frac{dI(0^+)}{dt}$, $\frac{d^2I(0^+)}{dt^2}$ for the circuit in Fig. Q5(b).

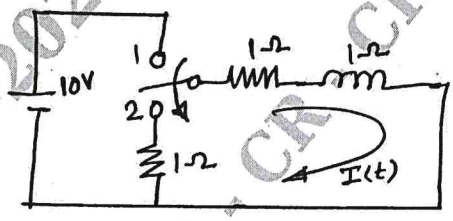
Fig. Q5 (b)



(05 Marks)

c. S – is moved from 1 to 2 at t = 0. Determine I(t) using Laplace Transformation for t > 0 in the circuit Fig. Q5(c). **(06 Marks)**

Fig. Q5 (c)

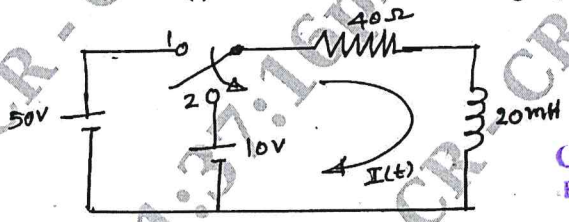


OR

6 a. Find Inverse Laplace Transform of $\frac{1}{s(s+1)}$. **(04 Marks)**

b. S – is changed from 1 to 2 at t = 0, find I(t) for t > 0 in the circuit Fig. Q6(b). **(06 Marks)**

Fig. Q6 (b)



c. A series R, L circuit with initial current I_O in inductor is connected to a D.C voltage V at t = 0. Derive an expression for I(t) through the inductor for t > 0. **(06 Marks)**

Module-4

7 a. Show the resonance frequency $f_0 = \sqrt{f_1 f_2}$ for series resonance circuit. **(05 Marks)**

b. Derive an expression for resonance frequency f_o in case of parallel resonance circuit when inductor L resistance R_L is considered. **(05 Marks)**

c. A series resonance circuit C = 1μF and its inductor L resistance is 16Ω. If the Bandwidth is 500rad/sec. Determine f_o, Q, L. **(06 Marks)**

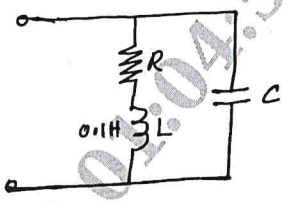
OR

8 a. Define Q – factor, Bandwidth, selectivity of series resonance circuit. **(06 Marks)**

b. Determine the frequency w_c, when the voltage across the capacitor is maximum incase of series resonance circuit. **(05 Marks)**

c. The inductor value L = 0.1H for the circuit Fig. Q8(c) and its Q value is 5. The resonance frequency of the circuit is 500rad/sec. Determine the values of capacitance C and R. **(05 Marks)**

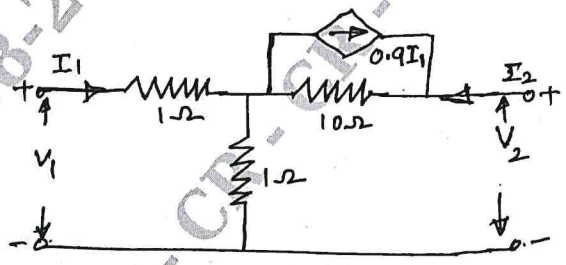
Fig. Q8 (c)



Module-5

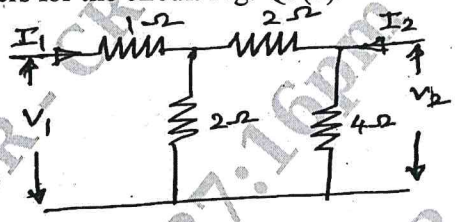
9 a. Determine Z – parameters for the circuit Fig. Q9(a). Using interrelationship between parameters, find Y parameters. **(08 Marks)**

Fig. Q9 (a)



b. Determine the h – parameters for the circuit Fig. Q9(b). **(08 Marks)**

Fig. Q9 (b)

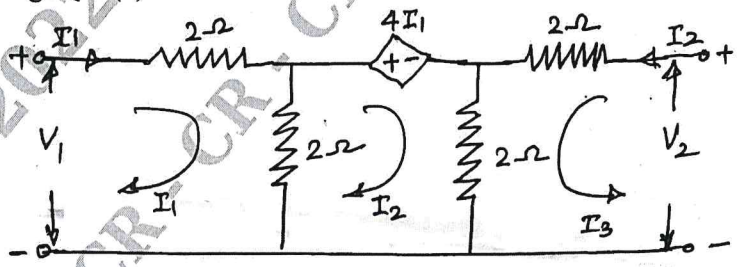


OR

10 a. Define Z – parameters and obtain the condition for symmetry. **(08 Marks)**

b. Determine Z – parameters, using Interrelationship between parameters, determine h parameters for the circuit Fig. Q10(b). **(08 Marks)**

Fig. Q10 (b)



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