Indian Institute of Information Technology, Design and Manufacturing Jabalpur

Quiz-1

Network Theory, Analysis & Synthesis **(EC203B)** **16-09-2023**

Marks: 50 **Time: 01:0 HR**

Answer all the questions.

Assume missing data (if any)

Q1. Write the expressions for the power dissipation and storage (whichever is applicable) in the resister, inductor and capacitor. **[03]**

Q2. Write the expressions for the voltage and currents across the resister, inductor, capacitor and diode. **[06]**

Q3. An inductor, Capacitor and Resister are excited individually with voltage source and connected through a switch. Illustrate.

(a) Currents and voltages at t=0-, 0+ & t=∞ when switch is closed to t=0 **[06]**

(b) Currents and voltages at t=0-, 0+ & t=∞ when switch is closed for a long time and opened t=0 **[06]**

Q4. What are the applications of Laplace transform and how it is different from the Fourier Transform, explain briefly. **[04]**

Q5. What are the ideal voltage and current sources, briefly explain? **[04]**

Q6. An equation of current of RL network is expressed by $10e^{-2t}$ and it is excited with 20Volts source.

(a) Draw RL network with an appropriate switching position. [03]

(b) Find the values of RL elements and time constant. **[04]**

Q7. Write the current response for RC circuit for Voltage source excitation connected through a switch at t=0. **[04]**

Q.8 Draw a frequency spectrum of time domain impulse function. **[02]**

Q.9. Write the dual quantities for capacitor and inductor in tabular form. **[04]**

Q10. Draw the equivalent circuits of series and shunt RLC network at resonance frequency. **[04]**

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Mid-Sem Exam

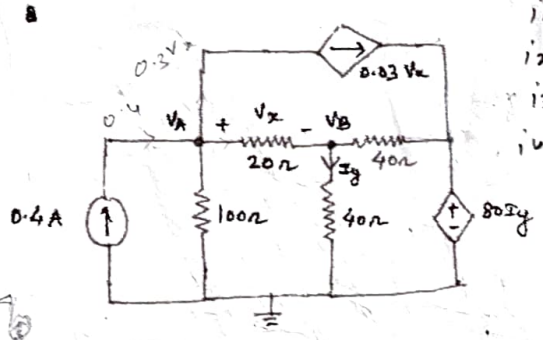
Network Theory (Analysis & Synthesis)-EC203B **23-09-2023**

Marks: 75 **Time: 02:0 HRS**

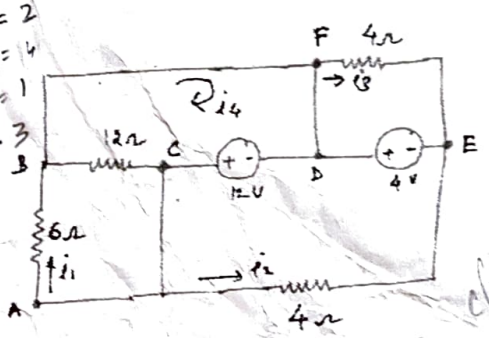
Answer all the questions.
Assume missing data (if any)

Q1. Find the voltages V_A, V_B, and V_x, in the network in Fig. **(A)** using node analysis. **[20]**

Q2. Find the currents i_1, i_2, and i_3, in the network in Fig. **(B)** using mesh analysis. **[15]**

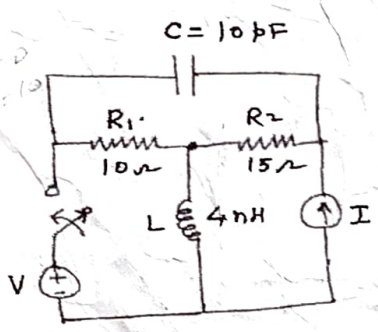


(A)

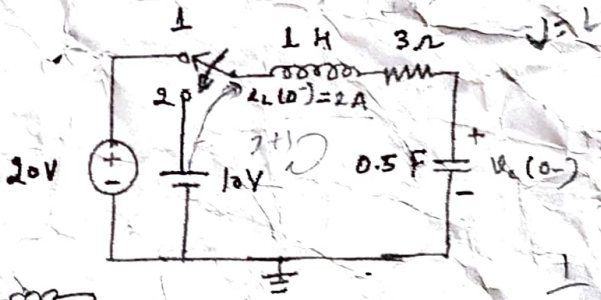


(B)

Q3. Using duality concept convert the network in Fig. **(C)** into its dual counterpart network and find the values of new elements. **[15]**



(C)



(D)

Q4. Using Laplace transform find the current in the loop in Fig. **(D)** if the switch is moved from contact 1 to 2 at t=0 and before this $i_L(o-) = 2A$ and $v_c(o-) = 2V$. **[15]**

Q5. Write and explain the below properties of the Laplace transform? **[10]**

(a) Time differentiation (b) Time integration (c) Frequency Shifting (d) Time shifting (d) Time scaling.