



2023BCE-012

Mid Sem Exam: Network Analysis and Synthesis (EE 202)
B. Tech (EEE) III Sem

Date: 26/09/2024

Roll Number:

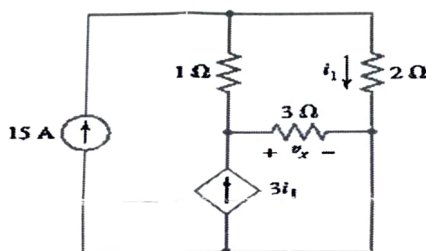
Total Time: 2 Hours

Maximum Marks: 70

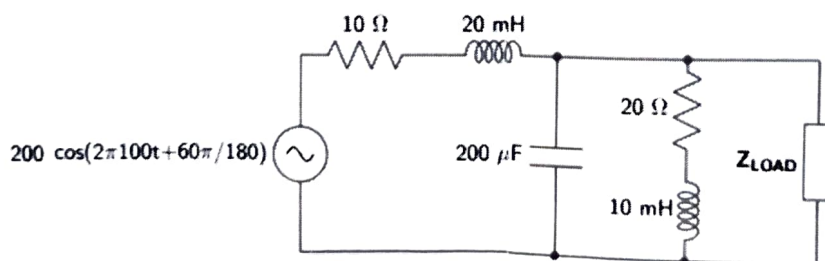
Instructions:

- This question paper consists of 7 questions. Each question is worth 10 Marks.
- Answer all questions; there are no optional questions.
- Assume the appropriate value of any missing data or information and mention it in your answer sheet.
- In case of missing steps/explanation, zero marks will be awarded (even if the final answer is right)
- Use of a calculator is allowed.

- Find out the value of i_1 and v_x . Hence, determine the power supplied by the dependent source in the figure shown below.



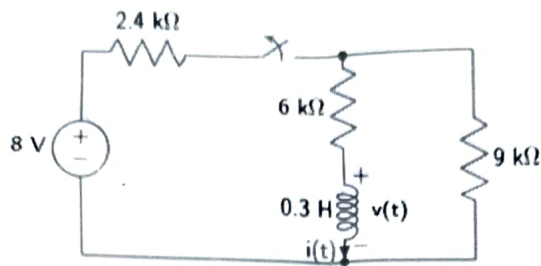
- Determine the value load impedance Z_{LOAD} for the maximum power transfer for the circuit shown below. Now, assume that the load impedance is purely resistive; what will be the value of R_{LOAD} for max. power transfer?



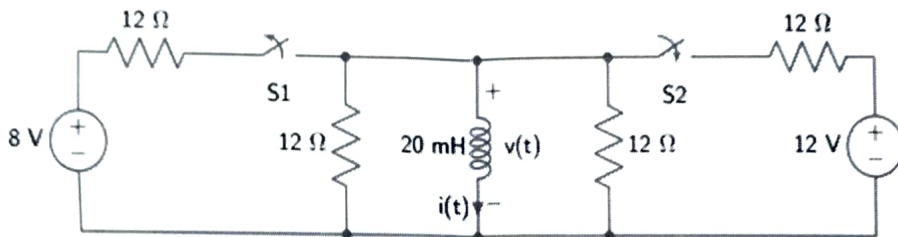
- Design a low-pass RC (Resistor-Capacitor) filter with a cutoff frequency of 1 kHz. Provide the following:
 - Determine the values of the resistor R and capacitor C for the filter.
 - Sketch the circuit diagram of the low-pass RC filter.
 - Derive the transfer function $H(s)$ of the filter.
 - Sketch the magnitude response of the filter.
 - Explain the working principle of the low-pass RC filter.



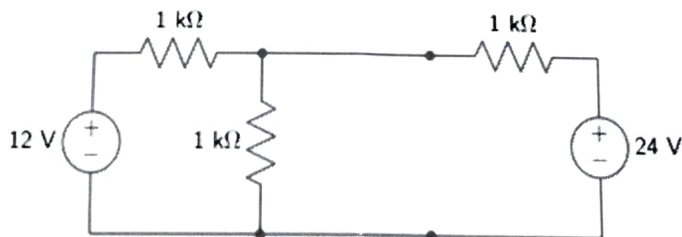
4. Find out the expression for $i(t)$ and hence determine $i(5\text{ms})$ & $i(\text{infinity})$ for the circuit below.
- The switch opens at a time of 0 seconds.



5. Calculate $i(0.005^+)$ for the circuit below. Switch S1 opens at a time of 0 seconds and switch S2 closes at a time of 0.005 seconds.



6. Determine the number of possible trees for the below-shown circuit. Also, find out the value of the current (i) using a tie-set matrix & loop equations.



7. Apply nodal analysis on the circuit shown below & find out the current flowing through 4 ohm resistance.

