**SCENARIO**

You are an electrical technician in an electronics factory. Your supervisor asked you to work on solving some practical issues in different types of circuits that you are used in the products. Try to use your knowledge about circuit theory and transformation techniques to simplify and solve those problems.

**To achieve the assessment criteria for pass (P1.1) you must answer the following tasks**

**Task 1:**

Use transformation theorems (i.e. Norton or Thévenin; Delta Star) to calculate the required circuit parameters as follows:

1. **For the figure below calculate:**
   * Mention the applied theory used in your answer.
   * The current through R2 and C1.
   * The voltage drop across R2.

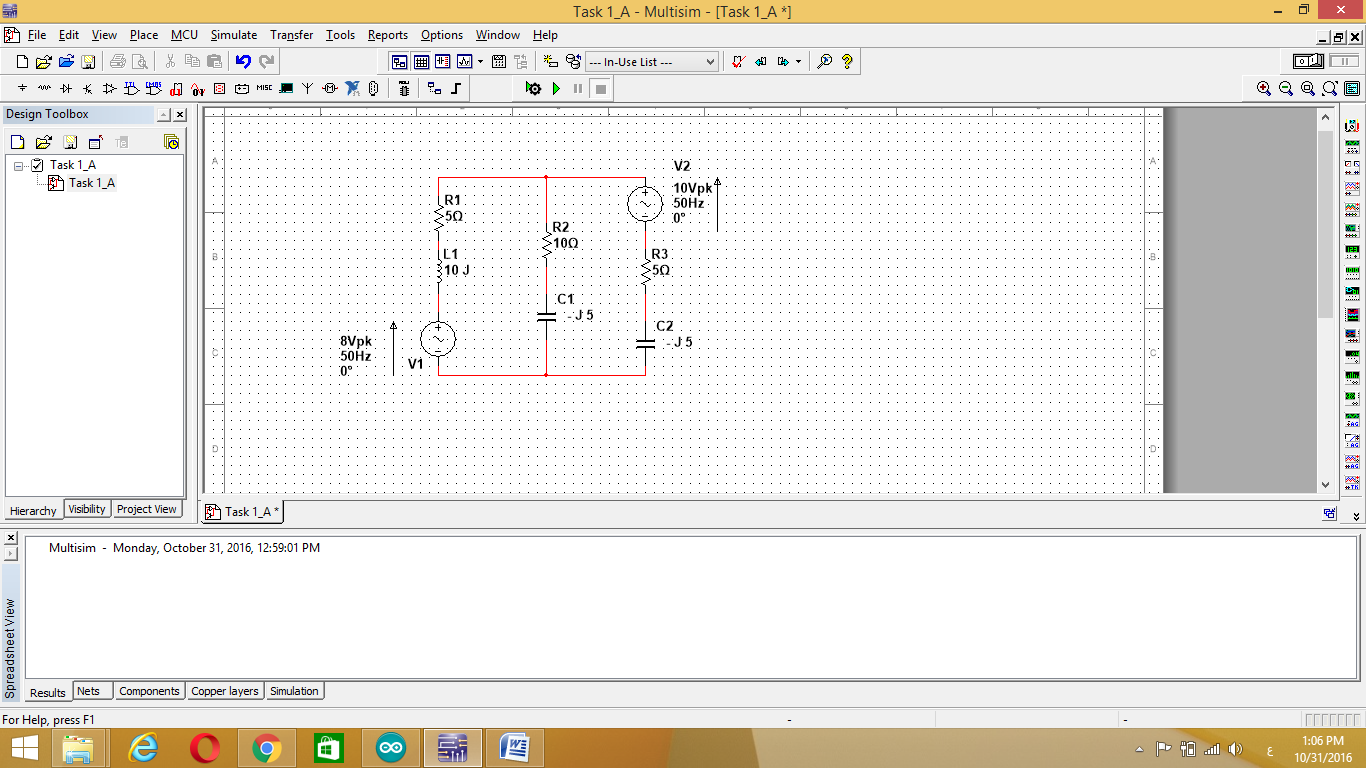


Figure (1): Task 1\_A

1. **For the figure below calculate:**
   * Mention the applied theory used in your answer.
   * Total circuit impedance.
   * Supply current

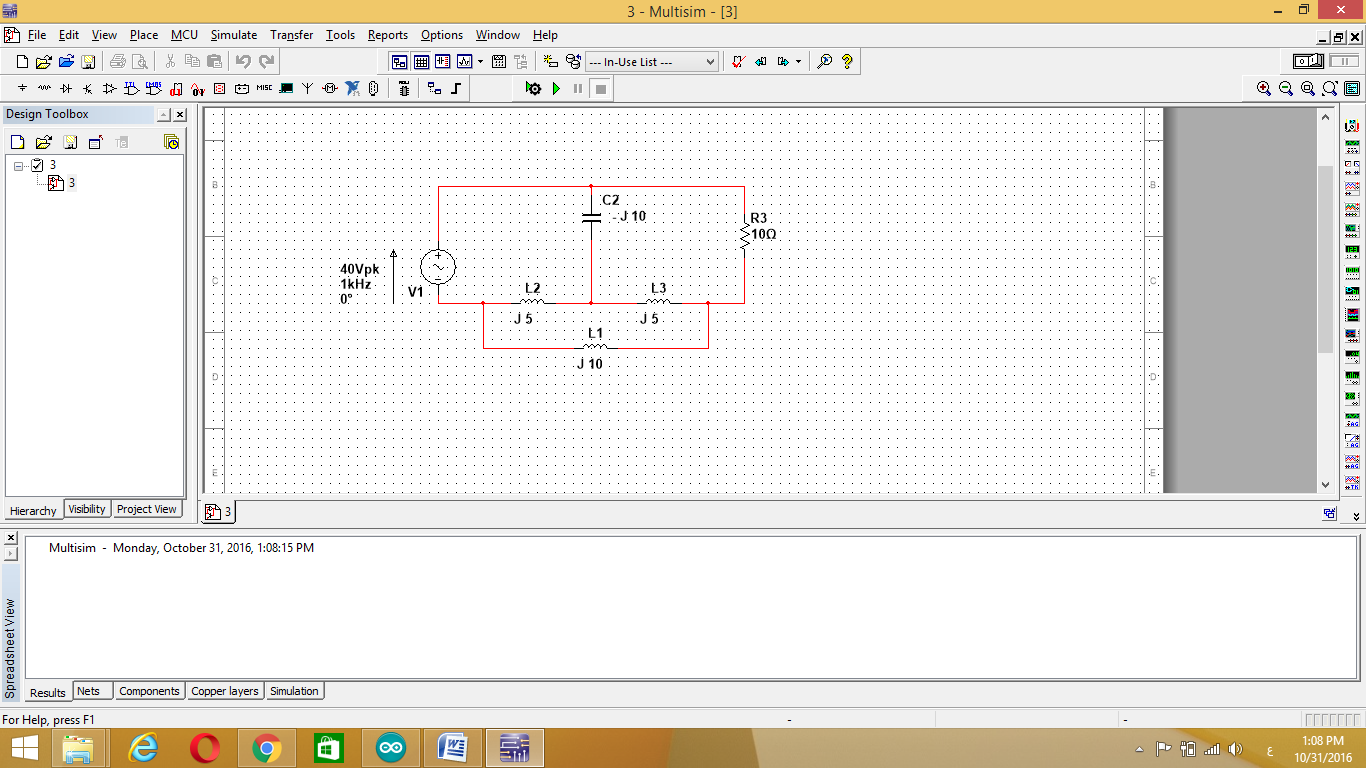
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Figure (2): Task 1\_B

**To achieve the assessment criteria for pass (P1.2 part 1/2) you must answer the following task:**

**Task 2:**

Apply circuit theory techniques (i.e. Max power, Mesh or Nodal, Super position) to solve the following problem

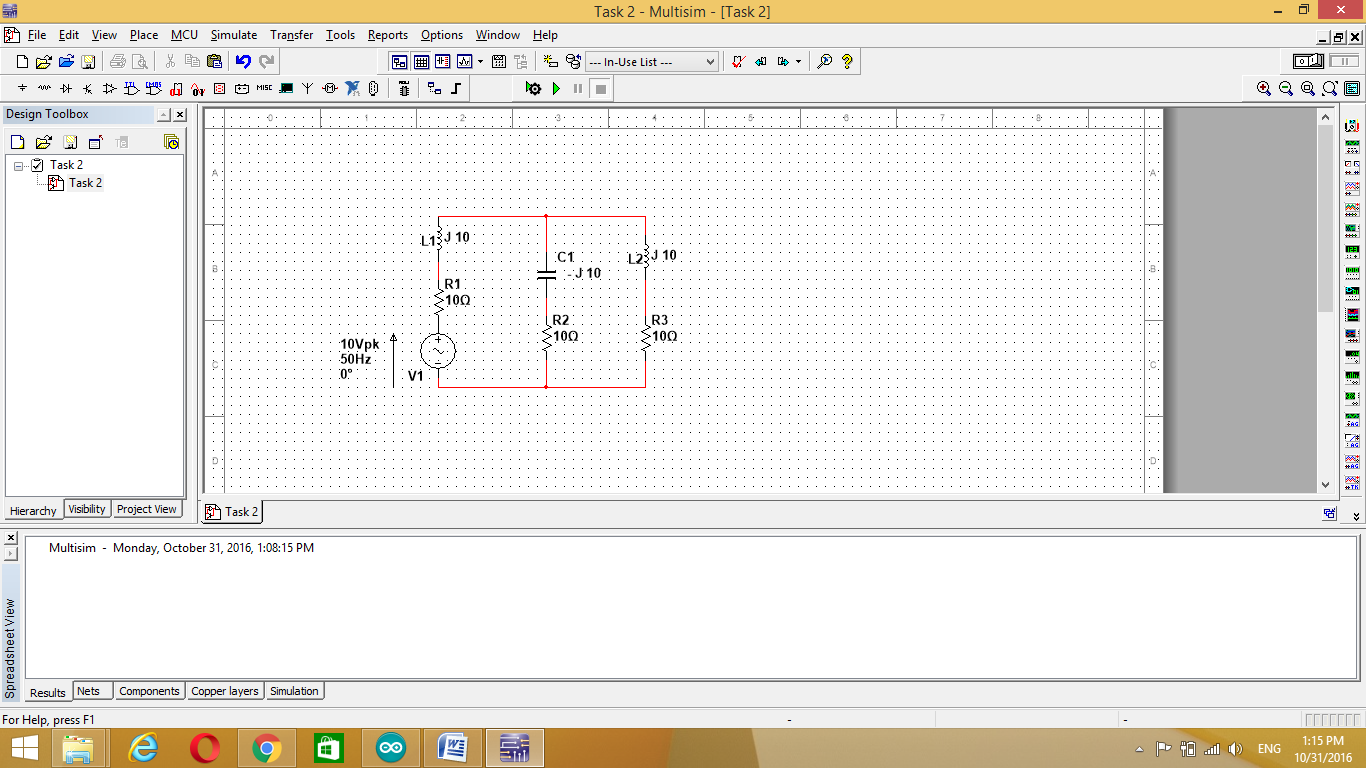


Figure (3): Task 2

The above circuit is a part from supply filter in a photocopier machine and it's important to know the voltage across C1 to be used, to ensure normal operation for long time without the circuit damaged.

**To achieve the assessment criteria for pass (P1.4 part 1/2) you must answer the following task:**

**Task 3:**

A practical filter part of radio receiver designed to operate at a frequency of 1 MHZ using **series RLC** connected. We need to redesign this filter using **10 k Ω** and the inductor with **1 mH**

**Use circuit theory to solve such a problem** to:

* Get the value of the capacitor.
* The total impedance at resonance with the phase angle.
* The quality factor.
* The bandwidth of the filter.
* Finally comment on the filter selectivity.