Family Name .....

Given Name .....

Student No. .....

Signature .....

UNSW SYDNEY

School of Electrical Engineering & Telecommunications

MID-SESSION EXAMINATION

Semester 1, 2017

ELEC1111
Electrical and Telecommunications Engineering

TIME ALLOWED:	**60 minutes**
TOTAL MARKS:	**50**
TOTAL NUMBER OF QUESTIONS:	**5**

THIS EXAM CONTRIBUTES 17.5% TO THE TOTAL COURSE ASSESSMENT

Reading Time: 5 minutes.

This paper contains 4 pages.

Candidates must **ATTEMPT ALL** questions.

Answer all questions in the answer booklet provided.

Marks for each question are indicated beside the question.

This paper **MAY** be retained by the candidate.

Print your name, student ID and question number on the front page of each answer book.

Authorised examination materials:

Candidates should use their own UNSW-approved electronic calculators.

This is a closed book examination.

Assumptions made in answering the questions should be stated explicitly.

All answers must be written in ink. Except where they are expressly required, pencils **may only be used** for drawing, sketching or graphical work.

QUESTION 1 [7 marks]

(i) For the circuit in Figure 1, calculate the equivalent resistance R_{eq} as seen by the voltage source terminals

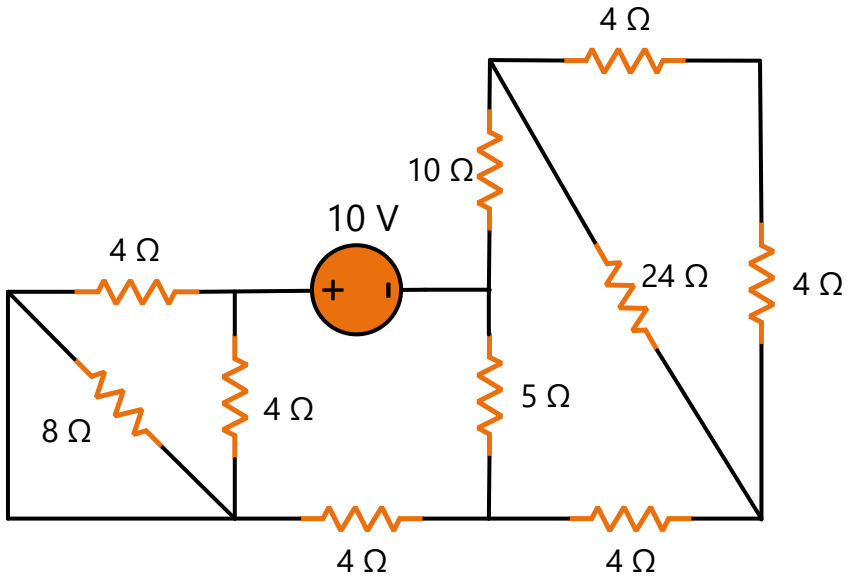

Figure 1.

QUESTION 2 [10 marks]

For the circuit shown below in Figure 2:

(i) (6 marks) Calculate voltage of the three nodes, a, b and c.
(ii) (3 marks) Calculate the power supplied/absorbed by the current source.
(iii)(1 marks) Calculate the power absorbed by resistor R_1.

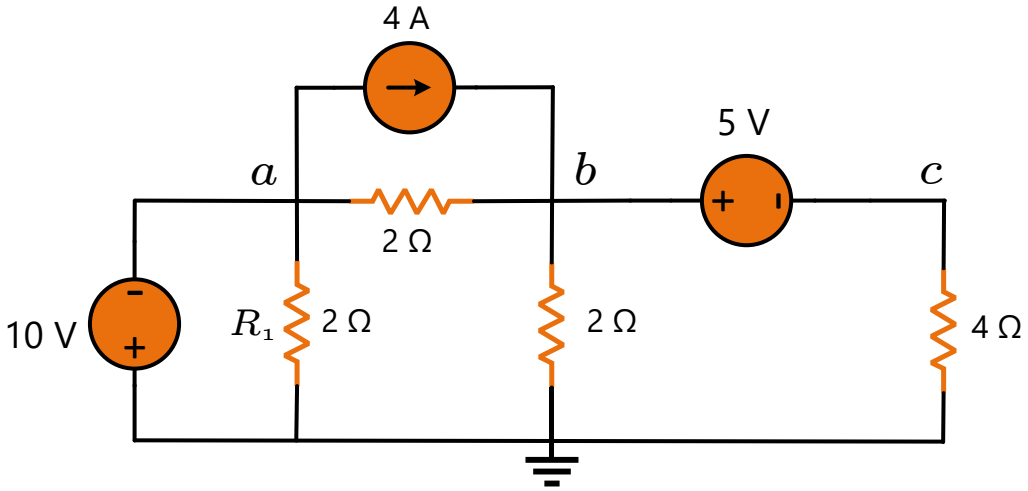

Figure 2.

QUESTION 3 [10 marks]

For the circuit shown below in Figure 3, use mesh analysis to write down enough equations to be able to solve for the mesh currents using the notations given in the figure. Clearly number the equations in your answers.
(**Note:** DO NOT SOLVE THE EQUATIONS)

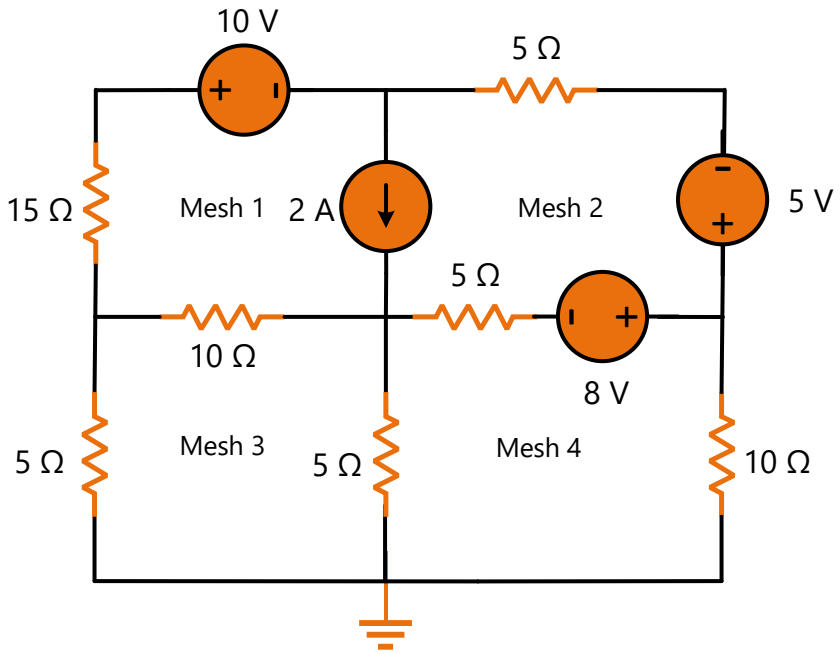

Figure 3.

QUESTION 4 [10 marks]

Find and draw the Thévenin equivalent circuit with respect to the terminals a-b.

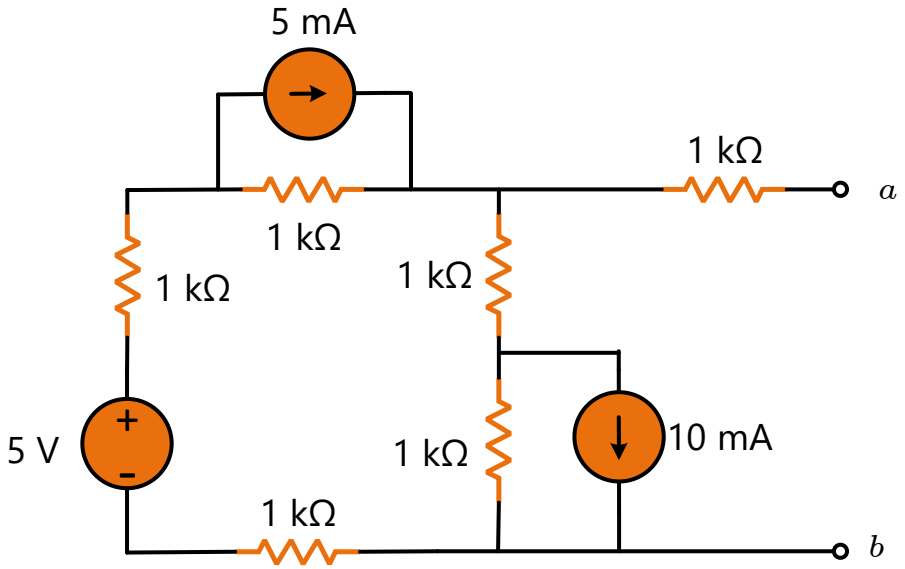

Figure 4.

QUESTION 5 [13 marks]

(i) **[5 marks]** For the circuit of Figure 5, calculate the energy stored in the capacitor C and the two inductors L_1 and L_2 when the circuit is in steady-state.

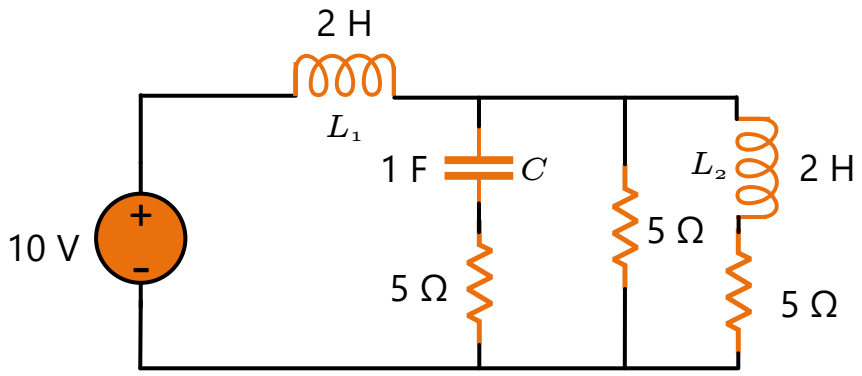

Figure 5.

(ii) **[8 marks]** The switch of the circuit shown in Figure 6 has been in position a for a long time. At t=0, the switch moves from position a to position b. Derive an analytical expression for the voltage of the capacitor $v_C(t)$ and the current of the resistor $i_R(t)$ (i.e. as a function of time) for $t > 0$.

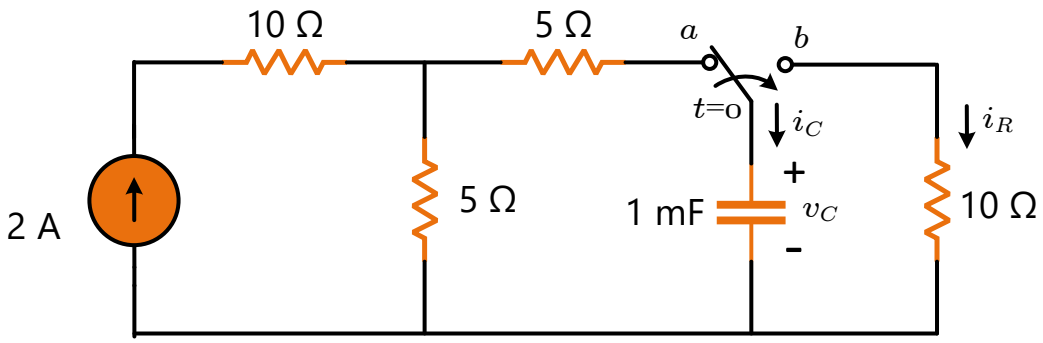

Figure 6.

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