INSTITUT D'ENSEIGNEMENT SUPÉRIEUR DE RUHENGERI

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CAT FOR WAVES AND OPTICS

FACULTY: FET

PROGRAMME/DEPARTMENT: REE&EPE

OPTION: REE&EPE	**Year: 2026**
MODULE CODE: EEE8126	**MODULE TITLE: Electrical Circuit Analysis**
DATE: 19/10/2026	**SESSION: Day Program**
DURATION: 2.5 h	**TOTAL MARKS: 40**
EXAMINER/LECTURER: Dr NDIZIHIWE Prosper	**MODERATOR(S): -**

INSTRUCTIONS TO THE CANDIDATE/STUDENT

This Exam has THREE Sections:

SECTION A is compulsory 25%

SECTION B: Choose two questions 50%

SECTION C: Choose one question. 25%

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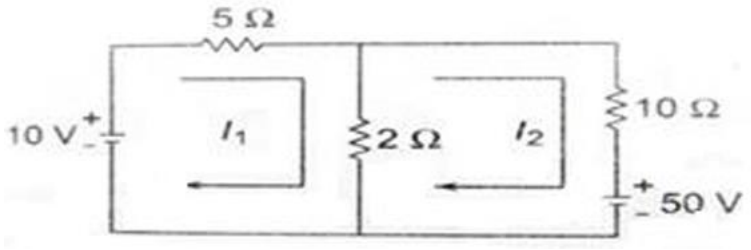
SECTION A / 20 marks

1. A) Plot a circuit diagram of the batteries serving a light bulb, with a control switch and name each component. **(/2marks)**

   B) What happens if the switch is placed on the negative terminal of the batteries **(/3 marks)**

2. Plot a closed electrical circuit composed by three bulbs in a) Series b) Parallel. Discuss the difference of the two on the functionality of bulbs and equivalence resistance **(/5 marks)**

3. Write down the mesh current equations for the circuit shown in the figure below and determine the currents I1 and I2.



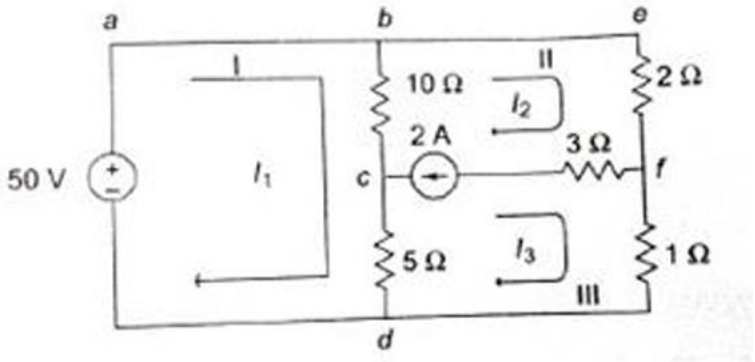
(/5 marks)

What is the meaning of the negative sign on the current I1 or I2?

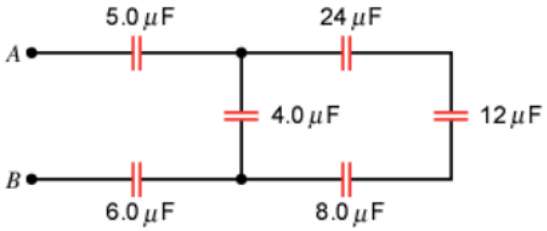
4. A family in the rural area uses a 400W light bulb in 10 hours per day, the electricity price is 310/KWh. How much does the electricity cost within a month? **(/5marks)**

SECTION B/ 20 marks

1. Determine the current in the 5 Ω resistor shown in the figure below. **(/7.5 marks)**



2. Determine the equivalent capacitance between AB in the given circuit. **(/7.5 marks)**



SECTION C/ 10 marks

1. A series RLC circuit containing a resistance of 12Ω, an inductance of 0.15H and a capacitor of 100uF are connected in series across a 100V, 50Hz supply. Calculate the total circuit impedance, the circuits current, power factor.

