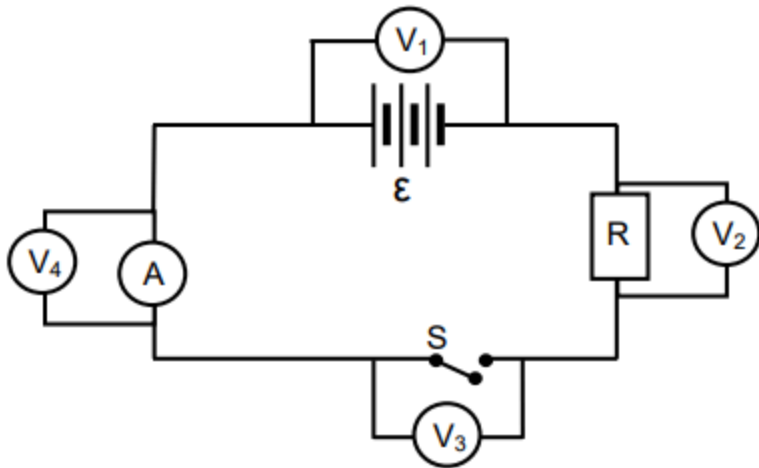# Electric circuits practice

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1.8   Four voltmeters, V_1, V_2, V_3 and V_4, are connected in a circuit, as shown in the diagram below.

Which voltmeter(s) will have the same reading as voltmeter V_1 when the switch is open?

A V_2 only

B V_3 only

C V_4 only

D V_2 and V_4 (2)


1.9   A split-ring commutator connects the coil of a generator to an external circuit.

Which ONE of the combinations below is CORRECT for the magnitude and direction of the induced current in the external circuit?

	MAGNITUDE OF INDUCED CURRENT	DIRECTION OF INDUCED CURRENT
A	Constant	Constant
B	Constant	Changes
C	Changes	Constant
D	Changes	Changes

(2)

The circuit diagram below shows a battery with an emf of 12 V and an internal resistance of 0,5 Ω connected to three resistors, a light bulb, a switch, an ammeter and connecting wires. The ammeter and connecting wires have negligible resistance.
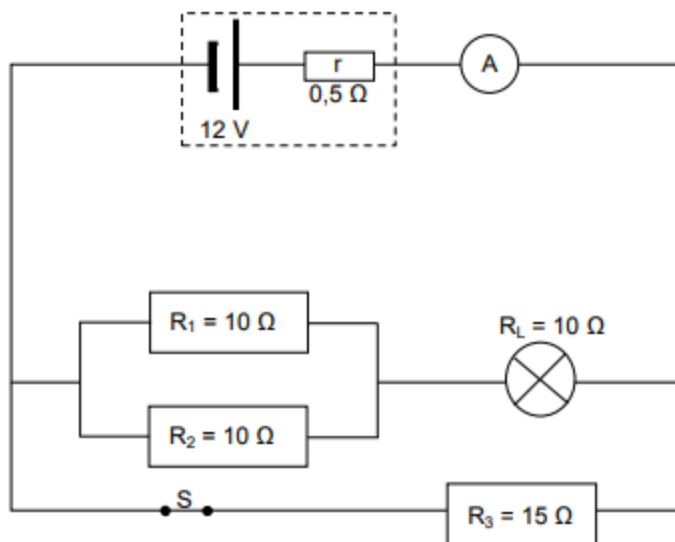
8.1   State Ohm's law in words.   (2)

Switch S is initially CLOSED.

8.2   Calculate the:

        8.2.1   Total external resistance of the circuit   (5)

        8.2.2   Reading on the ammeter   (3)

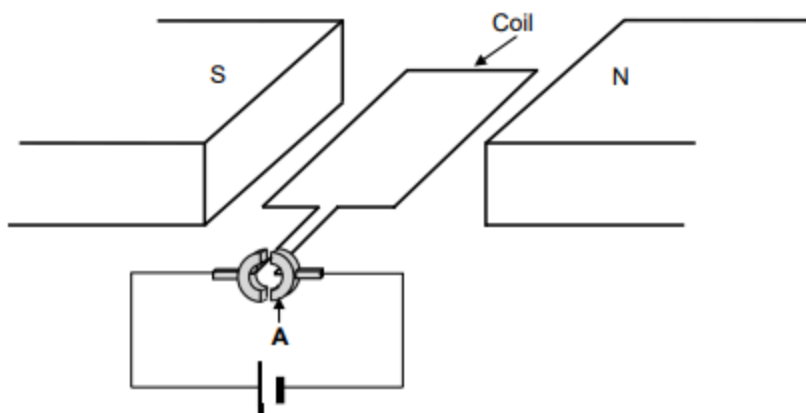   8.2.3   Power dissipated by resistor R_3 (4)

8.3   Switch S is now OPENED.

        8.3.1   If the resistance of the light bulb remains constant, how will the
                  brightness of the light bulb be affected? Choose from INCREASES,
   DECREASES or REMAINS THE SAME.   (1)

        8.3.2   Explain the answer to QUESTION 8.3.1.   (3)
                                                                                                     [18]

9.1   A simplified diagram of a DC electric motor is shown below.

9.1.1   Write down the name of component **A**.   (1)

9.1.2   State the energy conversion that takes place in the motor.   (1)

9.1.3   In which direction will the coil rotate? Choose from CLOCKWISE or
         ANTICLOCKWISE.   (2)

9.1.4   State TWO changes that can be made to the motor for the coil to
         rotate faster.   (2)

9.2 The circuit diagram below shows an electric kettle and a toaster connected to an AC source with an rms voltage of 220 V. The ammeter, connecting wires and switches S_1 and S_2 have negligible resistance.
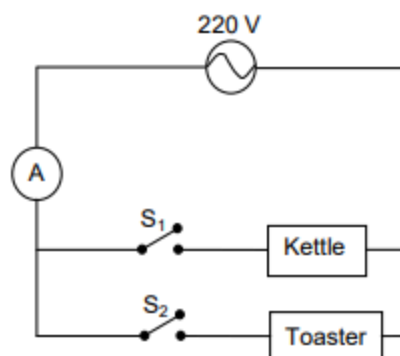
9.2.1 Define the term *root mean square current*. (2)

9.2.2 When switch S_1 is CLOSED and switch S_2 is OPEN, the maximum current through the circuit is 3,6 A.

Calculate the root mean square current in the circuit. (3)

9.2.3 When switch S_1 is OPEN and switch S_2 is CLOSED, the root mean square current in the circuit is 2,62 A.

Calculate the energy consumed by the toaster in two minutes. (3)

[14]