Name of the Student:_____
Max. Marks : 18 Marks **Time : 18 Minutes**

Q1.

The efficiency of an electric motor is investigated as shown in Figure 11.
The motor lifts a mass at a constant speed.

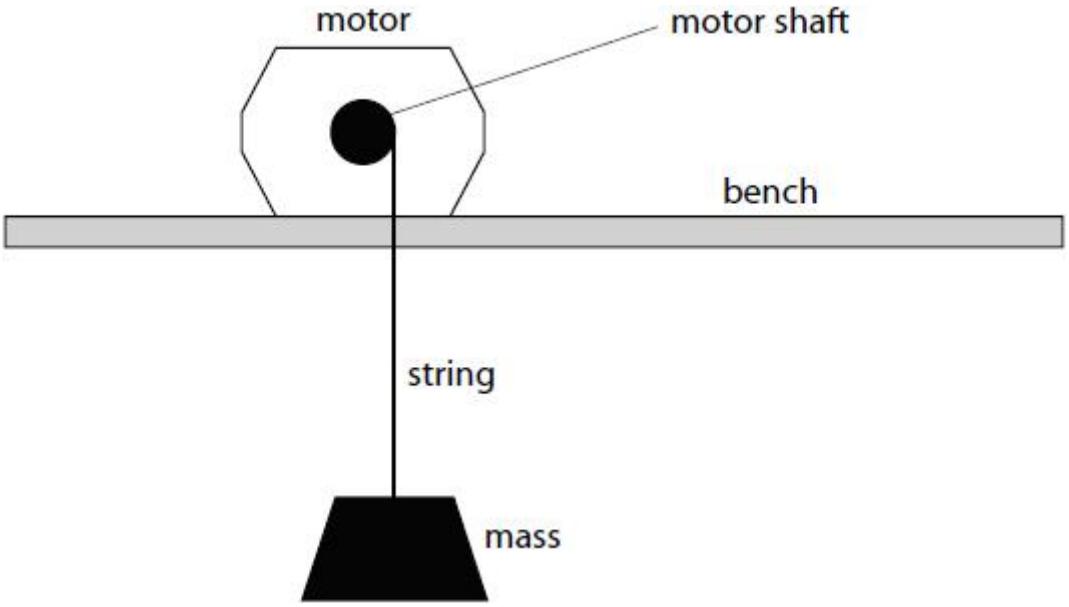

Figure 11

The results are shown in Figure 12.

current in motor	1.9 A
voltage across motor	10.0 V
time taken to lift mass	9.0 s

Figure 12

(a) Which of these changes would improve the results?

(1)

☒ **A** Repeating the investigation with different masses

☒ **B** Repeating the readings and calculating averages

☒ **C** Using a motor that works with a higher voltage

☒ **D** Using a shorter piece of string to lift the mass

(b) Show that the total energy supplied to the motor in the 9 s is about 170 J.

(2)

(c) Which row of the table is correct for the resistance of the motor?

(1)

	resistance of motor =	resistance of motor =
☐ **A**	$I \div V$	$I^2 \div P$
☐ **B**	$V \div I$	$P \div I^2$
☐ **C**	$V \div I$	$P \times I^2$
☐ **D**	$I \times V$	$P \div I^2$

(d) When the motor lifts the mass, the coil in the motor becomes warm.

Explain why the coil becomes warm.

(3)

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(Total for question = 7 marks)

Q2.

*A resistor is a circuit component.

Two other circuit components are a light dependent resistor (LDR) and a thermistor.

Explain how LDRs and thermistors can be used to control the current in a circuit.

(6)

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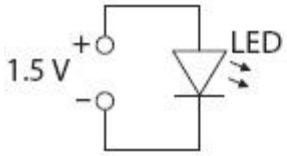
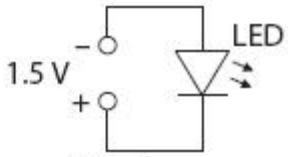
Q3.

A light emitting diode (LED) can only emit light when connected correctly to a potential difference.

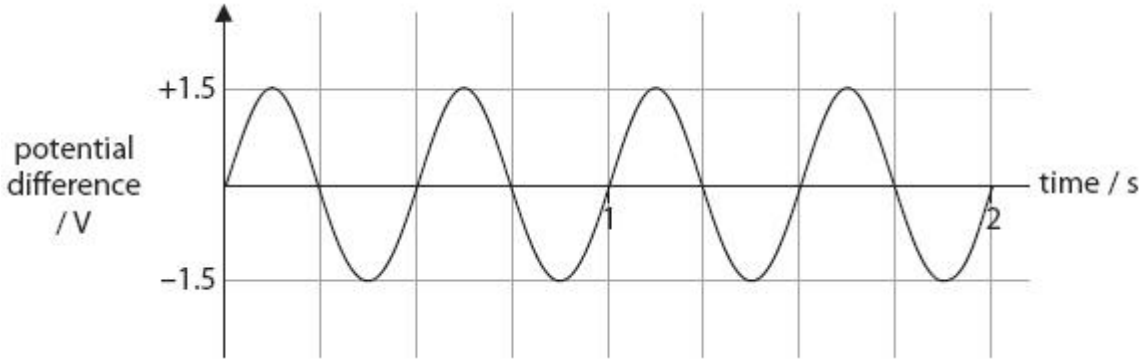


LED emits light



LED does **not** emit light

Use this information to suggest what happens when this alternating voltage is connected across the LED.



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Q4.

Figure 1 gives the names of three atomic particles and some descriptions of the charge on the particles and their position in the atom.

Draw one straight line from each atomic particle to its correct description.

(3)

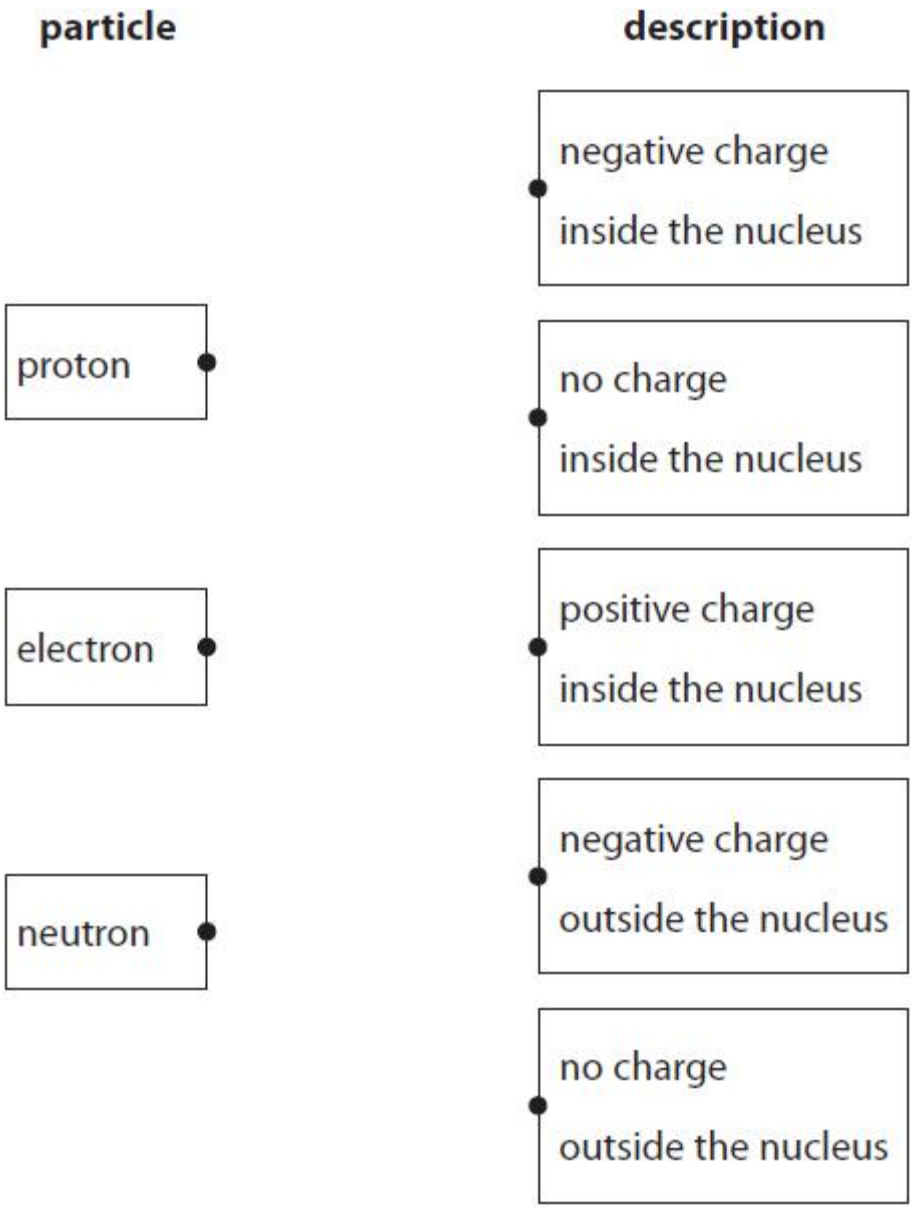

Figure 1

(Total for question = 3 marks)