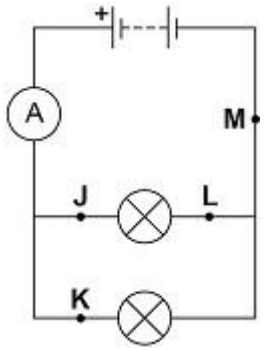
Name of the Student:_____

Max. Marks : 17 Marks **Time : 17 Minutes**

Q1.

Figure 1 shows a circuit diagram.

Figure 1



(a) In which position could a switch be placed so that both lamps can be switched on or off at the same time?

Tick (✓) **one** box.

J ☐ **K** ☐ **L** ☐ **M** ☐

(1)

(b) Draw the circuit symbol for a switch in the box below.

(1)

(c) In 30 seconds, 24 coulombs of charge flow through the battery.

Calculate the current in the battery.

Use the equation:

$$\text{current} = \frac{\text{charge flow}}{\text{time}}$$

Current = _____ A

(2)

(d) There is a potential difference of 3.6 V across the battery.

Calculate the energy transferred by the battery when 60 coulombs of charge flows through the battery.

Use the equation:

energy transferred = charge flow × potential difference

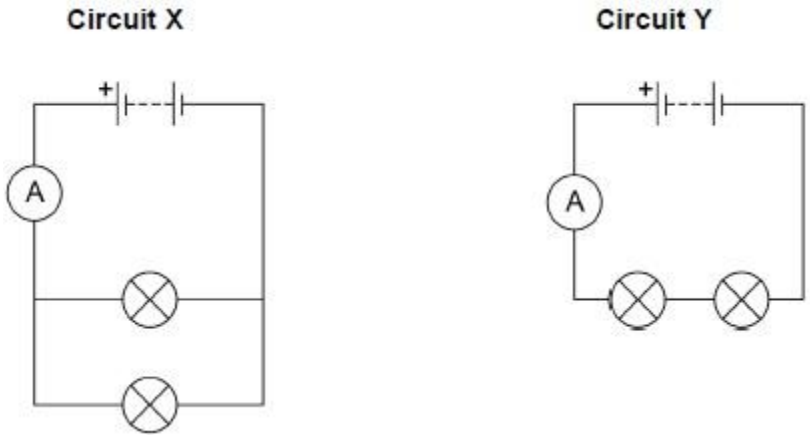
Energy transferred = _____ J

(2)

A student built **Circuit X** and **Circuit Y** shown in **Figure 2**.

The components used in each circuit were identical.

Figure 2



(e) How would the reading on the ammeter in **Circuit Y** compare to the reading on the ammeter in Circuit X?

Tick (✓) **one** box.

The reading in **Y** would be higher. ☐

The reading in **Y** would be lower. ☐

The readings would be the same. ☐

(1)

(f) How does the total resistance of **Circuit Y** compare with the total resistance of **Circuit X**?

Tick (✓) **one** box.

The total resistance of **Y** is greater. ☐

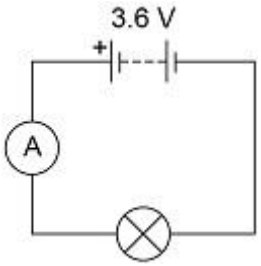
The total resistance of **Y** is less. ☐

The total resistance is the same. ☐

(1)

The student built another circuit which is shown in **Figure 3**.

Figure 3



(g) Write down the equation which links current, potential difference and resistance.

_____

(1)

(h) There is a potential difference of 3.6 V across the lamp in **Figure 3**.

The current through the lamp is 0.80 A

Calculate the resistance of the lamp.

_____

_____

_____

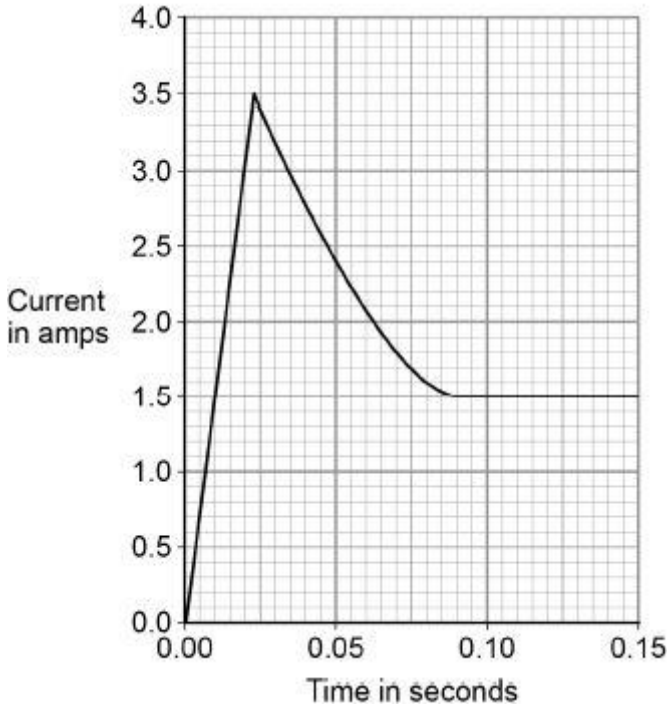
Resistance = _____ Ω

(3)

(Total 12 marks)

Q2.

The graph below shows how the current through a filament lamp changes after the lamp is switched on.



(a) The normal current through the filament lamp is 1.5 A.

For how many seconds is the current through the filament lamp greater than 1.5 A?

Tick **one** box.

0.01 s ☐

0.08 s ☐

0.09 s ☐

0.14 s ☐

(1)

(b) Why might the filament inside a lamp melt when the lamp is first switched on?

_____

_____

(1)

(c) The lamp is connected to a 24 V power supply. The current through the lamp is 1.5 A.

Calculate the power of the lamp.

Use the equation:

power = potential difference × current

_____

_____

_____

_____

Power = _____ W

(2)

(d) LED lamps are much more efficient than filament lamps.

What does this statement mean?

Tick **one** box.

- LED lamps have a similar power output to filament lamps. ☐
- LED lamps waste a smaller proportion of the input energy than filament lamps. ☐
- LED lamps have a higher power input than filament lamps. ☐
- LED lamps waste a larger proportion of the input energy than filament lamps. ☐

(1)

(Total 5 marks)