Name of the Student:_____

Max. Marks : 18 Marks **Time : 18 Minutes**

Q1.

A student investigated how the current in a circuit varied with the number of lamps connected in parallel in the circuit.

Figure 1 shows the circuit with three identical lamps connected in parallel.

Figure 1

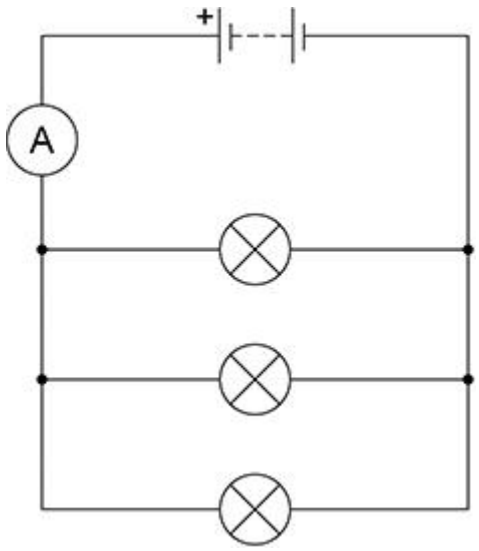
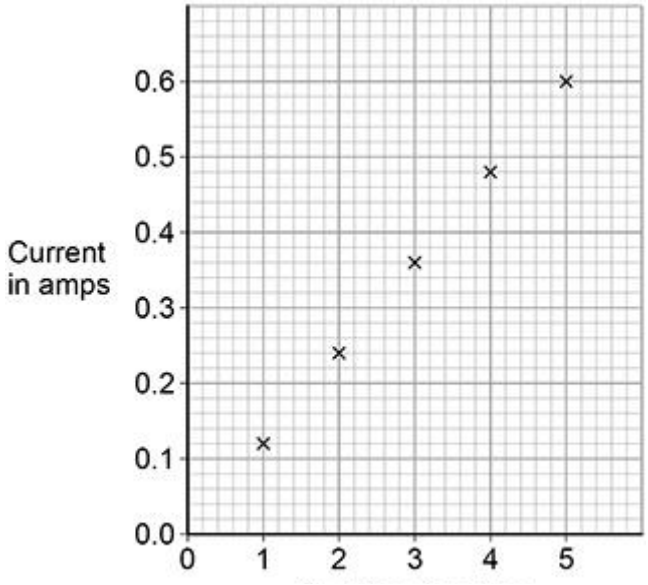


Figure 2 shows the results**.**

Figure 2



(a) Complete the sentences.

Choose answers from the box.

Each answer can be used once, more than once or not at all.

decreased	**stayed the same**	**increased**

As the number of lamps increased, the current _____.

As the number of lamps increased, the total resistance of the circuit _____ .

As the number of lamps increased, the potential difference across the battery _____ .

(3)

(b) When there were three lamps in the circuit the ammeter reading kept changing between 0.35 A and 0.36 A.

What type of error would this lead to?

Tick (✓) **one** box.

Random error ☐

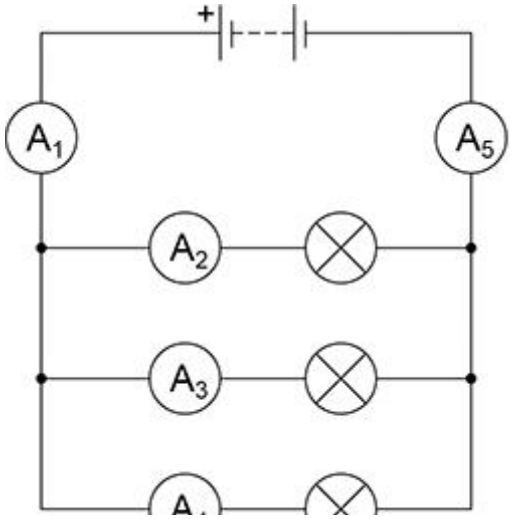
Systematic error ☐

Zero error ☐

(1)

Figure 3 shows a circuit with five ammeters and three identical lamps.

Figure 3



(c) Complete the table below to show the readings on ammeters A_2 and A_5.

Ammeter	**A_1**	**A_2**	**A_3**	**A_4**	**A_5**
Current in amps	0.36		0.12	0.12	

(2)

(d) The resistance of one lamp is 15 Ω.

The current in the lamp is 0.12 A.

Calculate the power output of the lamp.

Use the equation:

$$\text{power} = (\text{current})^2 \times \text{resistance}$$

_____

_____

_____

Power = _____ W

(2)

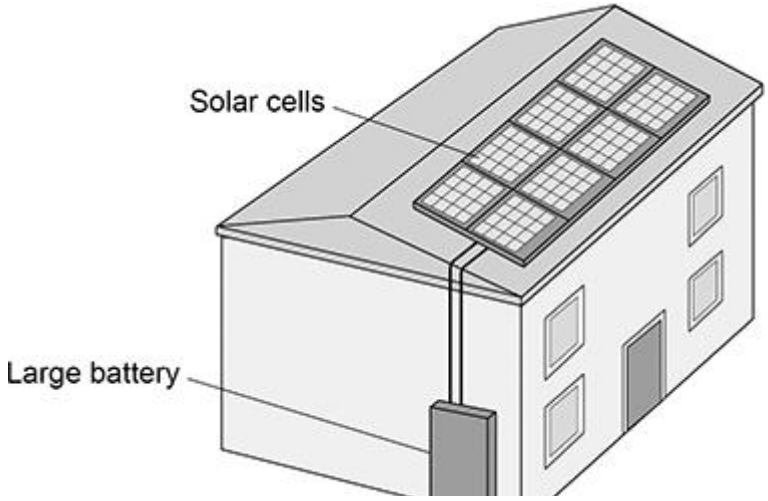
(Total 8 marks)

Q2.

The figure below shows a house with a solar power system.

The solar cells generate electricity.

When the electricity generated by the solar cells is not needed, the energy is stored in a large battery.



(a) The solar cells on the roof of the house always face in the same direction.

Explain **one** disadvantage caused by the solar cells only facing in one direction.

_____

_____

_____

_____

(2)

(b) The mean current from the solar cells to the battery is 3.5 A.

Calculate the charge flow from the solar cells to the battery in 3600 seconds.

Use the equation:

charge flow = current × time

_____

_____

_____

Charge flow = _____ C

(2)

(c) Write down the equation which links efficiency, total power input and useful power output.

_____

(1)

(d) At one time in the day, the total power input to the solar cells was 7500 W.

The efficiency of the solar cells was 0.16

Calculate the useful power output of the solar cells.

_____

_____

_____

_____

Useful power output = _____ W

(3)

(e) The wasted energy that is **not** usefully transferred by the solar cells is dissipated.

What happens to energy that has been dissipated?

Tick (✓) **one** box.

The energy becomes less useful.	☐
The energy is destroyed.	☐
The energy is used to generate electricity.	☐

(1)

(f) Why is it unlikely that all the UK's electricity needs could be met by solar power systems?

Tick (✓) **one** box.

A very large area would need to be covered with solar cells.	☐
Solar power is a non-renewable energy resource.	☐
The efficiency of solar cells is too high.	☐

(1)

(Total 10 marks)