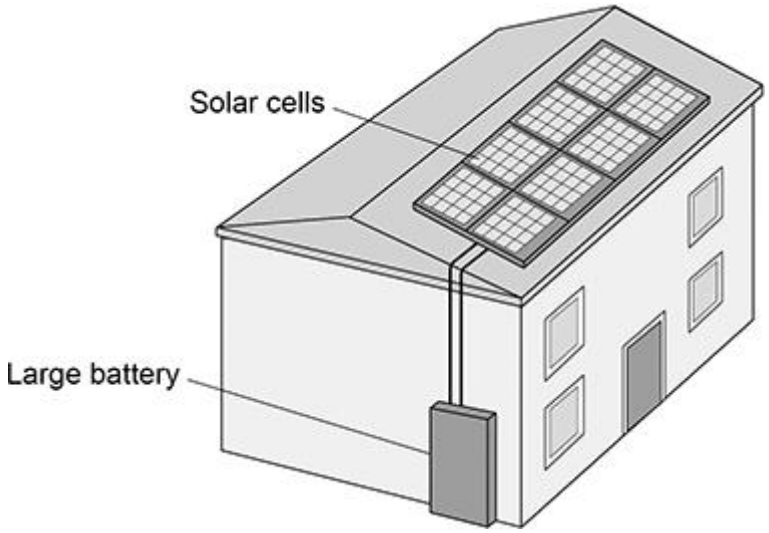
Name of the Student:_____
Max. Marks : 17 Marks **Time : 17 Minutes**

Q1.

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?

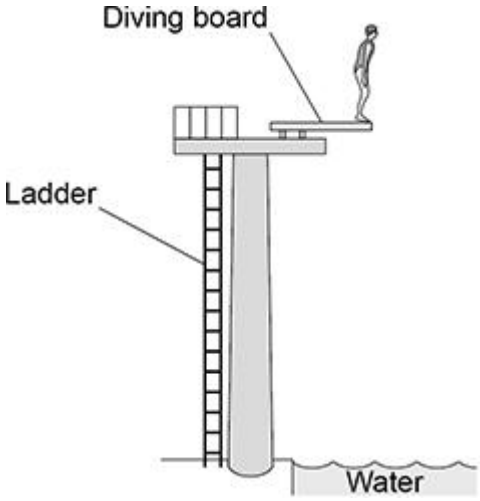
Tick (✓) **one** box.

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)

Q2.

The figure below shows a diver about to dive off a diving board.



(a) Complete the sentences.

Choose answers from the box.

elastic potential	**gravitational potential**	**kinetic**	**nuclear**

As the diver falls towards the water there is a decrease in

her _____ energy.

As the diver falls towards the water there is an increase in

her _____ energy.

(2)

(b) Write down the equation which links kinetic energy (E_k), mass (m) and speed (v).

_____

(1)

(c) At the instant the diver hits the water, the kinetic energy of the diver is 5040 J.

The speed of the diver is 12 m/s.

Calculate the mass of the diver.

_____

_____

_____

_____

Mass = _____ kg

(3)

(d) Most of the kinetic energy of the diver is transferred to the water.

How does this affect the thermal energy of the water?

Tick (✓) **one** box.

The thermal energy decreases.	☐
The thermal energy stays the same.	☐
The thermal energy increases.	☐

(1)

(Total 7 marks)