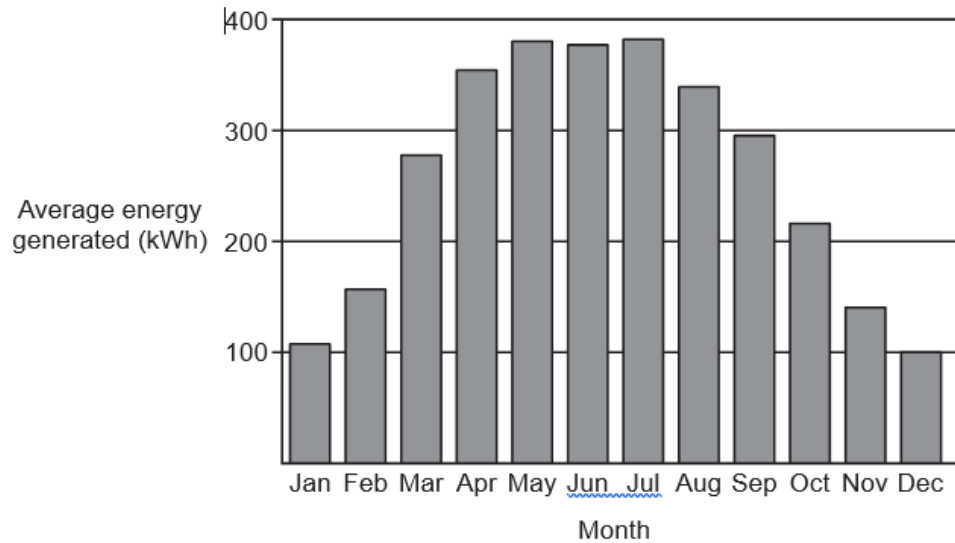# GCSE Physics B (Twenty First Century Science)
J259/02 Depth in physics (Foundation Tier)

Question Set 29

1   Kai wants to buy solar panels for his house.

A local solar panel company has provided him with **data** on the amount of energy he can **expect** to generate per month from a 4 kW solar panel system, based on average sunshine over the last 30 years.

Kai's friend Amir has owned solar panels for a year, and has recorded the energy his 4 kW solar panel system has generated over twelve months, as shown in the table.

Month	Energy generated (kWh)
January	150
February	160
March	170
April	210
May	350
June	400
July	300
August	380
September	360
October	180
November	160
December	40

(a)   **(i)**   Give **one** similarity and **one** difference between the data from the local solar panel company, and Amir's data.

[2]

Similarity - more energy generated in Summer.

Difference - trend is more dynamic for Amir's data.

       (ii)   Give **two** reasons why there is greater uncertainty in Amir's data than the local solar panel company's data.

[2]

• The company used an average of 30 years whereas Amir's is just over one year.

• Data based on past record so unlikely to follow the trend forward.

(b) Kai requires a system that will deliver a minimum power of 3800 W to his house.

He must also buy storage batteries to provide electricity when solar or wind power is not available. These cost £250.

	One wind turbine	One solar panel
Maximum power output (W)	1250	350
Voltage (V)	12	12
Cost (£) per item	1500	415

(i) Calculate the total cost to deliver a minimum power of **3800 W** to his house, using **solar panels**.

$$\frac{3800}{350} = 11 \text{ panels}$$

$$11 \times 415 = 4565$$
$$4565 + 250 = 4815$$

Total cost = £ ....4815.............. **[3]**

(ii) Kai has £5000 to spend.

Which system should Kai use to deliver a minimum power of 3800 W to his house?

Wind turbines ☐

Solar panels ☑

Explain your answer.

$$\frac{3800}{1250} = 3.04 = 4 \text{ turbines needed}$$

$$(4 \times 1500) + 250 = 6250$$

$$6250 > 5000$$
so can only afford
Solar panels.

[2]

Total Marks for Question Set 29: 9