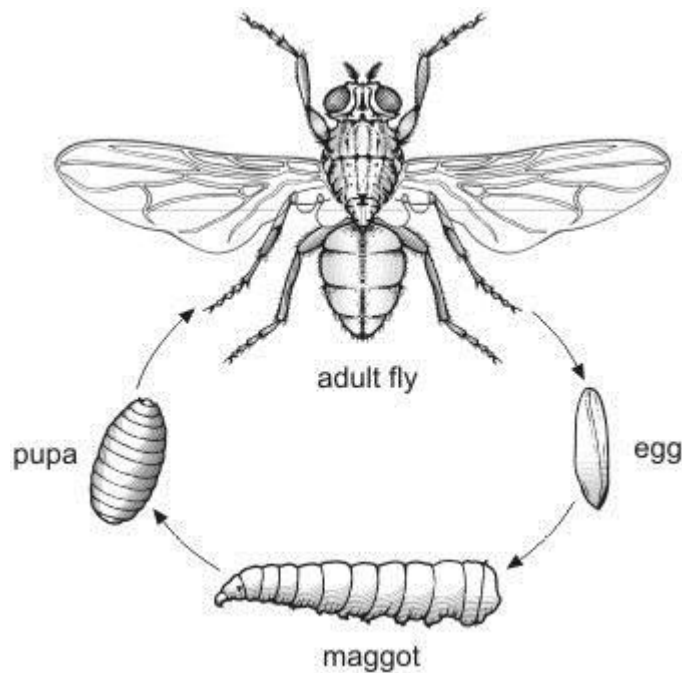


## SET 3 – Aiming for level 7-9 at GCSE

Q1.

The life cycle of the housefly is shown below.



*not to scale*

Before the seventeenth century, people believed that maggots found on rotting meat came either from the meat **or** from the air and **not** from eggs of the housefly.

In 1668, a doctor named Francesco Redi placed some meat into three separate containers:

- container 1, left open to the air
- container 2, sealed with a lid
- container 3, covered with a fine mesh.

He left the containers for several days in a room containing adult houseflies. His results are shown below.



(a) Look at the drawings and read the sentences beneath them.

(i) How do Redi's results show that maggots do **not** come from rotting meat?

.....  
.....

1 mark

(ii) How do Redi's results show that maggots do **not** come from the air?

.....  
.....

1 mark

(b) The maggots that hatched on the meat in container 1 could complete their life cycle.

Explain why the maggots that hatched on the mesh on container 3 could **not** complete their life cycle.

.....  
.....

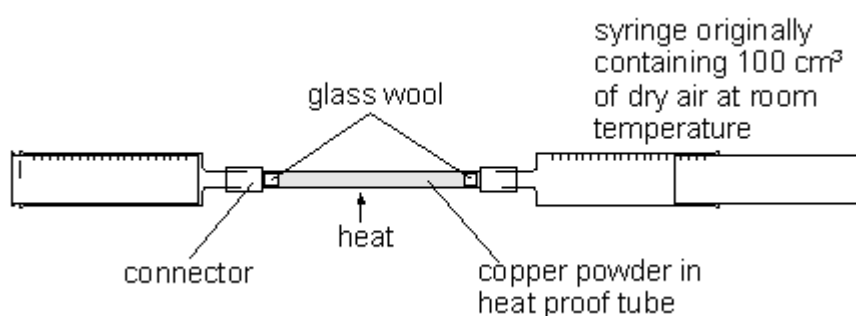
1 mark

(c) Give **two** reasons why meat should be kept in a refrigerator.

.....  
.....

2 marks  
maximum 5 marks

**Q2.** The apparatus shown below was set up. The 100 cm<sup>3</sup> of clean, dry air was passed backwards and forwards across the hot copper powder. The volume of air left in the syringe, when the apparatus had cooled back to room temperature, was 79 cm<sup>3</sup>.



(a) (i) Why did the volume of air decrease?

.....

1 mark

(ii) Why did the volume of air not decrease below 79 cm<sup>3</sup>?

.....

1 mark

- (b) (i) The surface of the copper was seen to be black at the end of the experiment. What is the chemical formula of the black solid which is formed?

.....

1 mark

- (ii) What type of reaction takes place in this experiment?

.....

1 mark

- (iii) Write a balanced equation for the formation of the black solid.

.....

1 mark

Maximum 5 marks

### Q3.

The table below shows the pH in different parts of the digestive system.

part of digestive system	pH
mouth	6.5 – 7.5
stomach	1.0 – 2.5
small intestine	7.0 – 8.0

- (a) Amylase is an enzyme which speeds up the digestion of starch. Amylase is produced by the salivary glands.

Why does amylase stop working in the acidic conditions in the stomach?

.....

.....

1 mark

- (b) As food passes from the stomach into the small intestine, a different digestive juice is mixed with the food.

- (i) Use the information in the table to suggest what type of substance this digestive juice is.

.....

1 mark

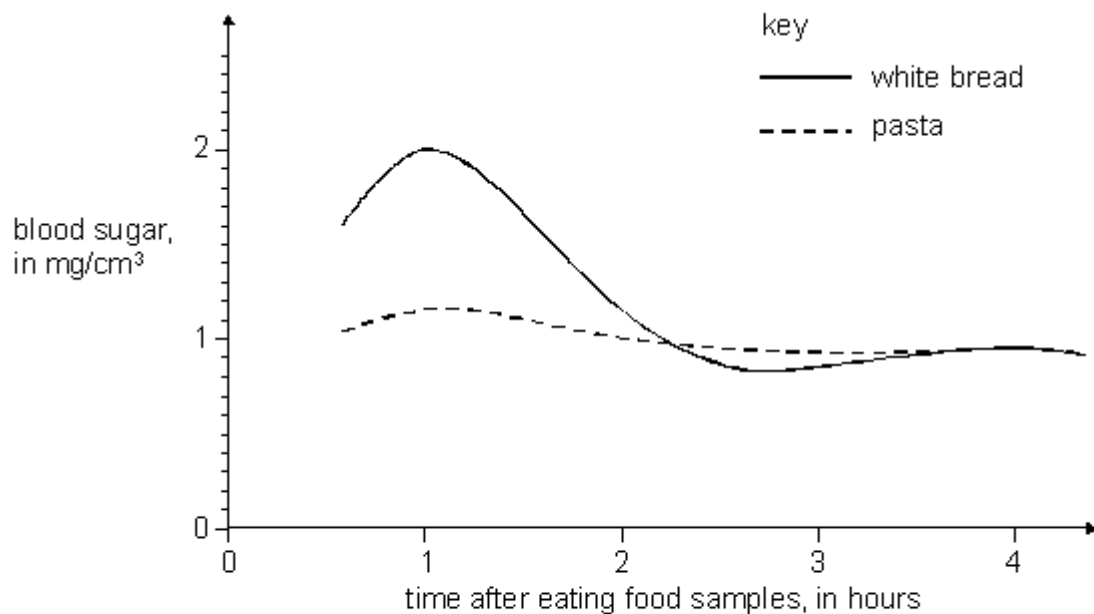
- (ii) What type of chemical reaction takes place as this digestive juice mixes with the acid from the stomach?

.....

1 mark

- (c) After food containing starch is digested, a person's blood sugar level rises. The body responds by producing a chemical called insulin. Insulin lowers the blood sugar level again.

The graph below shows how a person's blood sugar level changes after eating two different samples of food.



- (i) Use the graph to help you to explain why less insulin would be produced one hour after eating pasta than one hour after eating white bread.

.....  
.....

1 mark

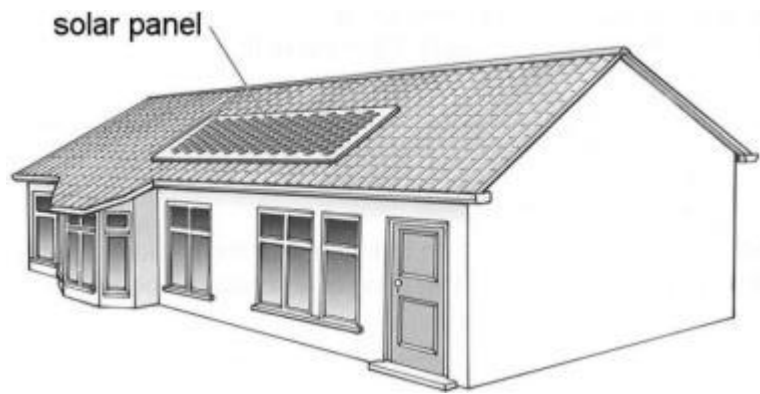
- (ii) Suggest the normal blood sugar level in this case.

.....

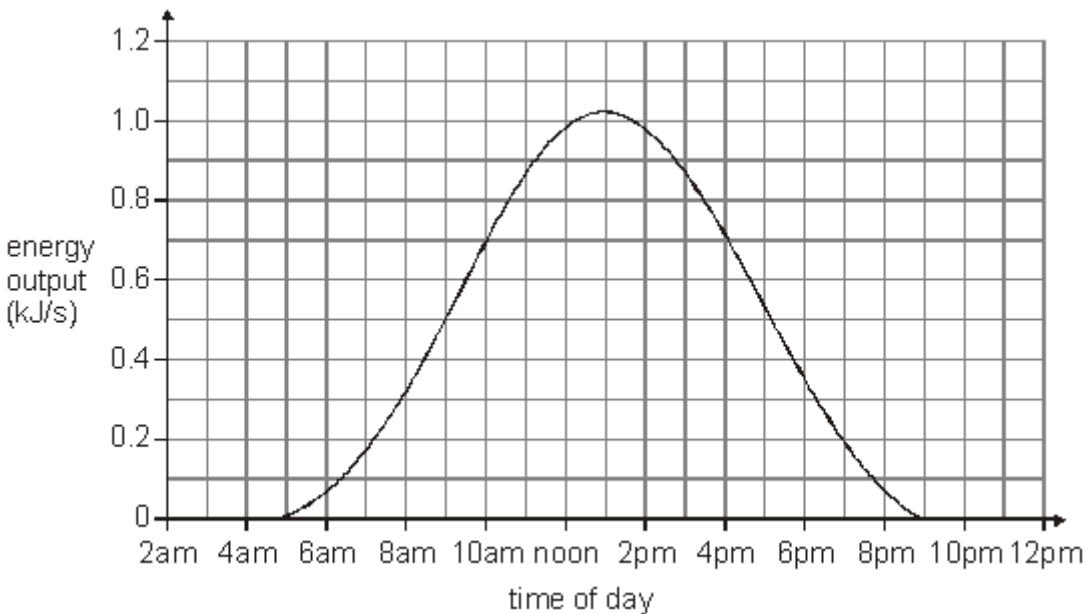
1 mark  
Maximum 5 marks

**Q4.**

The drawing below shows a solar panel fixed to the roof of a house in Britain.



- (a) Daniel measured the energy output from this solar panel during one day in June. The graph below shows his results.



- (i) Why does the energy output from the solar panel vary during the day?

.....  
.....

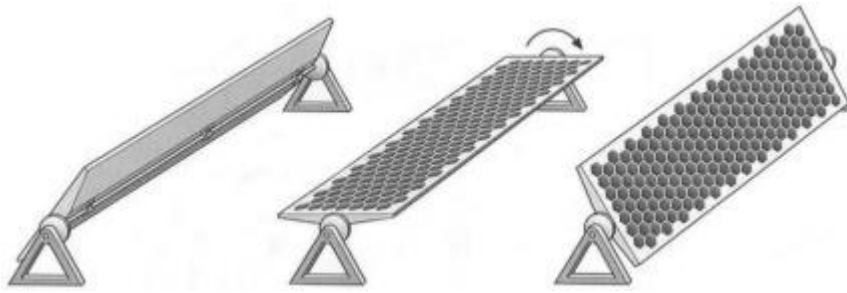
1 mark

- (ii) Daniel used the solar panel to run a motor.  
The motor needs 0.7 kJ/s to run at full speed.  
Use the graph to find out how long Daniel's motor would run at full speed.

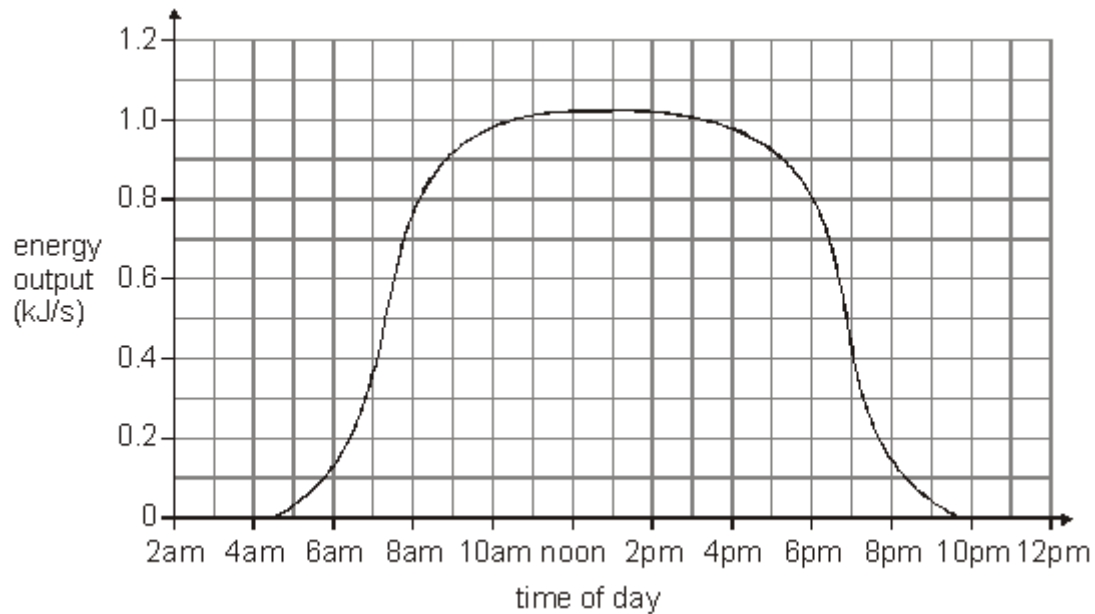
..... hours

1 mark

- (b) Daniel measured the energy output from a different solar panel.  
This type of solar panel turns so that it always faces the Sun.



The graph below shows the energy output for this panel during one day in **mid-summer**.



- (i) On the graph above draw another curve to show how the energy output for this solar panel might vary on a day in **mid-winter**.

2 marks

- (ii) Between 7am and 7pm the solar panel turns through an angle of  $180^\circ$ . Calculate the angle the solar panel turns through each hour.

.....

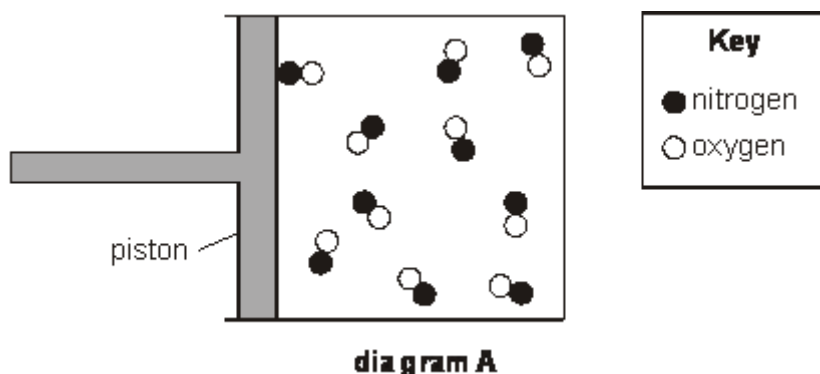
.....degrees

1 mark  
maximum 5 marks

**Q5.**

Diagram **A** represents a gas in a container.

The gas can be compressed by moving the piston to the right.



- (a) (i) How can you tell that the substance in the container is a gas?

.....  
.....

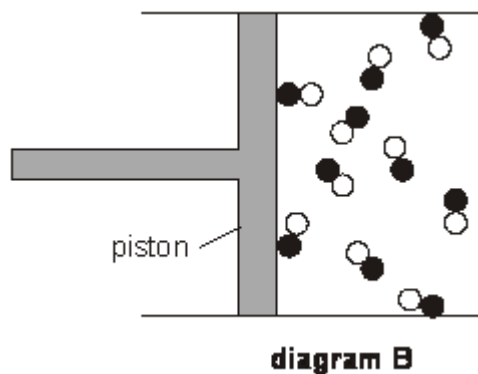
1 mark

- (ii) How can you tell from the diagram that the gas is pure?

.....  
.....

1 mark

- (b) The piston is moved to the right as shown in diagram **B**.

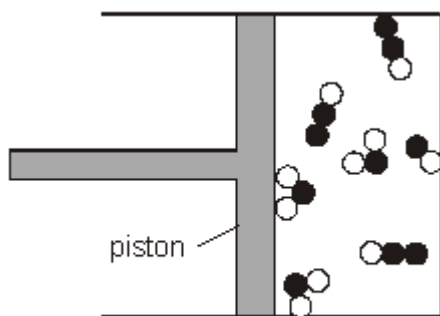


How can you tell, from diagram **B**, that the pressure of the gas has increased?

.....  
.....

1 mark

- (c) Diagram **C** shows what happened to the molecules after the gas was compressed more.



**diagram C**

- (i) How can you tell that a chemical reaction happened when the gas was compressed?

.....  
 .....

1 mark

- (ii) The mass of the gas in both diagrams **B** and **C** was 0.3 g.

Why did the mass of the gas **not** change when it was compressed?

.....  
 .....

1 mark

- (iii) Complete the table below with the correct chemical formula of each substance. Use the key to help you.

substance	formula

Key	
	nitrogen
	oxygen

1 mark

- (iv) What is the **name** of the substance represented by the symbol ?

.....

1 mark  
 maximum 7 marks



