Name of the Student:_____
Max. Marks : 23 Marks **Time : 23 Minutes**

Q1.

Amylase is an enzyme that digests starch in the digestive system.

(a) Explain why starch has to be digested.

_____

_____

_____

_____

(2)

A student used a colorimeter to investigate the rate of starch digestion.

A colorimeter measures the percentage of light passing through a liquid.

The darker the colour of the liquid, the less light passes through.

The student:

- mixed 1 cm^3 of starch suspension with 10 cm^3 of iodine solution
- measured the percentage of light passing through the mixture
- repeated with different concentrations of starch suspension.

Figure 1 shows the results.

Figure 1

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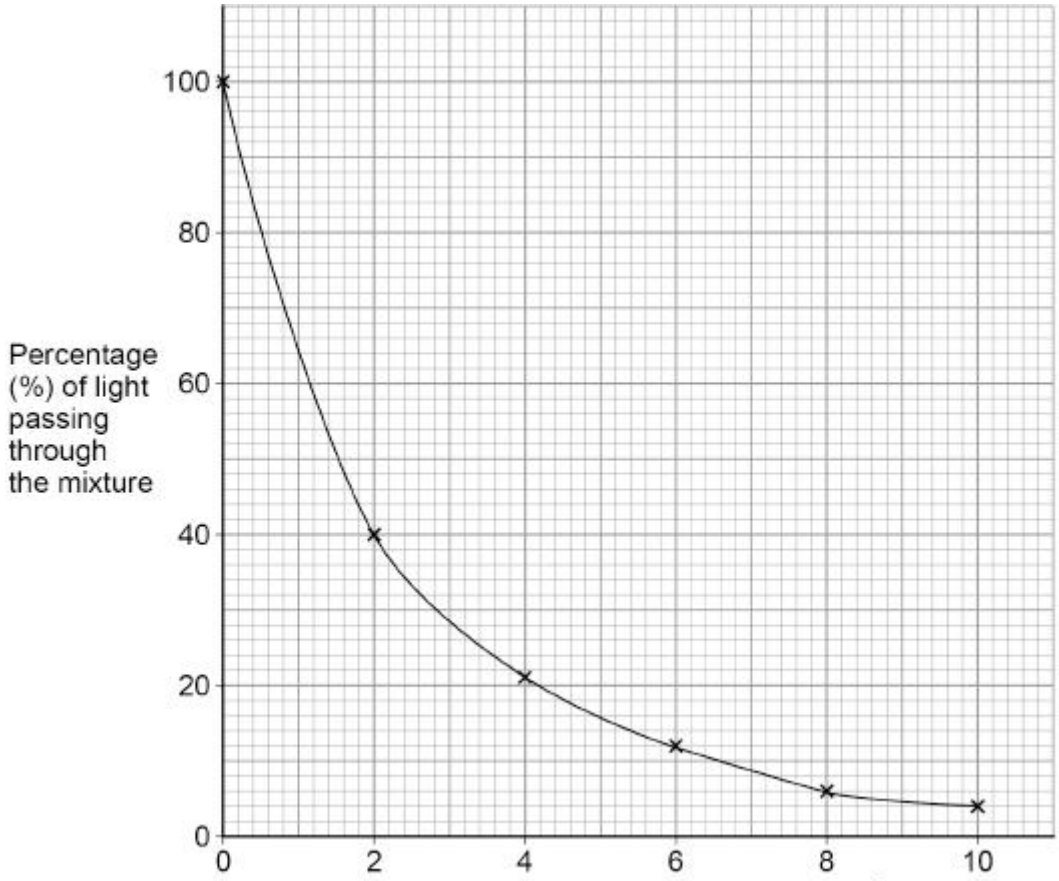

(b) Suggest what liquid was used for the test with 0 g/dm^3 starch concentration.

_____

_____

(1)

(c) Explain the change in the percentage of light passing through the different concentrations of starch suspension in iodine solution.

Use **Figure 1**.

_____

_____

_____

_____

_____

_____

(3)

The student then investigated the rate of starch digestion using amylase.

This is the method used.

1. Put 10 cm^3 of starch suspension into a test tube.

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2. Put 5 cm^3 of amylase solution into a separate test tube.

3. Put both test tubes into a water bath at 37 °C for 10 minutes.

4. Mix the contents of both test tubes together in a beaker.

5. Put the beaker into the water bath.

6. Remove 1 cm^3 of the mixture and add it to 10 cm^3 of iodine solution.

7. Measure the percentage of light passing through the liquid.

8. Repeat steps 6 and 7 every minute for 5 minutes.

(d) The starch suspension and the amylase solution were kept in the water bath for 10 minutes before being mixed together.

Give the reason why.

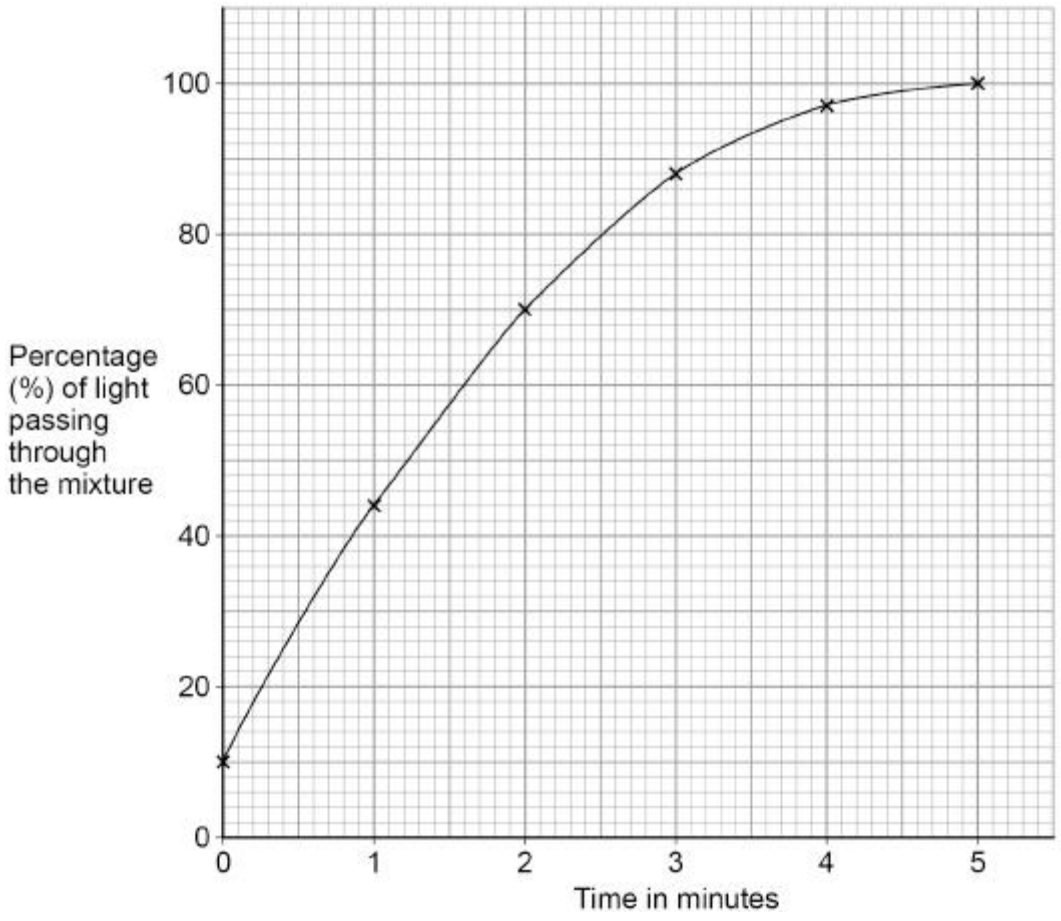
_____

_____

(1)

Figure 2 shows the results.

Figure 2



(e) The concentration of starch at 3 minutes was 0.3 g/dm^3.

Calculate the mean rate of starch digestion for the first 3 minutes.

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Use **Figure 1** and **Figure 2**.

Mean rate = _____ g/dm^3 per minute

(4)

(f) The investigation was carried out at pH 7

Explain how the results would be different if the investigation was carried out at pH 1

Use **Figure 2**.

(3)

(Total 14 marks)

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Q2.

Photosynthesis is an important chemical reaction in plants.

(a) Why is light needed for photosynthesis?

_____

_____

(1)

(b) What is the equation for photosynthesis?

Tick (✓) **one** box.

$C_6H_{12}O_6 + CO_2 \rightarrow 6\ O_2 + 6\ H_2O$ ☐

$CO_2 + H_2O \rightarrow CH_2O + O_2$ ☐

$6\ CO_2 + 6\ H_2O \rightarrow C_6H_{12}O_6 + 6\ O_2$ ☐

$6\ O_2 + 6\ H_2O \rightarrow C_6H_{12}O_6 + 6\ CO_2$ ☐

(1)

(c) A student investigated the effect of different colours of light on the rate of photosynthesis at room temperature.

The student used pondweed in water.

A piece of pondweed was placed in red light, then in blue light and then in green light.

Each colour of light was the same intensity.

Describe how the student should make accurate measurements to obtain valid results for the rate of photosynthesis.

_____

_____

_____

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_____

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_____

(4)

A scientist investigated the effect of different wavelengths of light on the rate of photosynthesis.

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The wavelength of light determines the colour of the light.

Figure 1 shows the student's results.

Figure 2 shows the scientist's results.

Figure 1

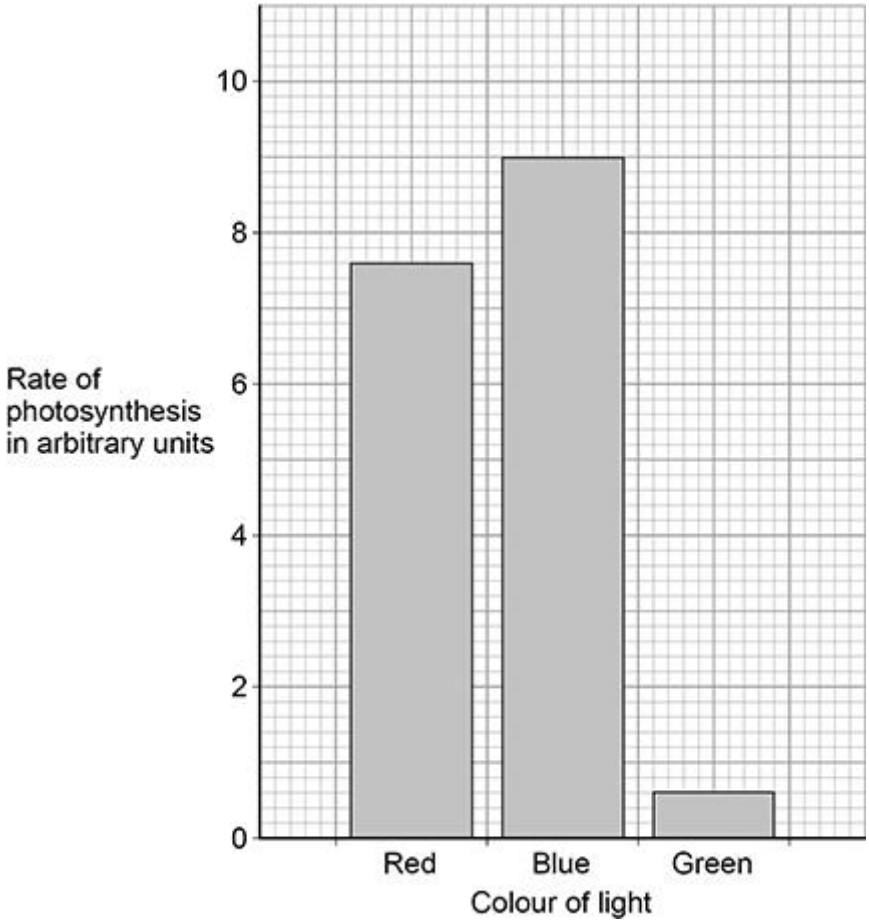

Figure 2

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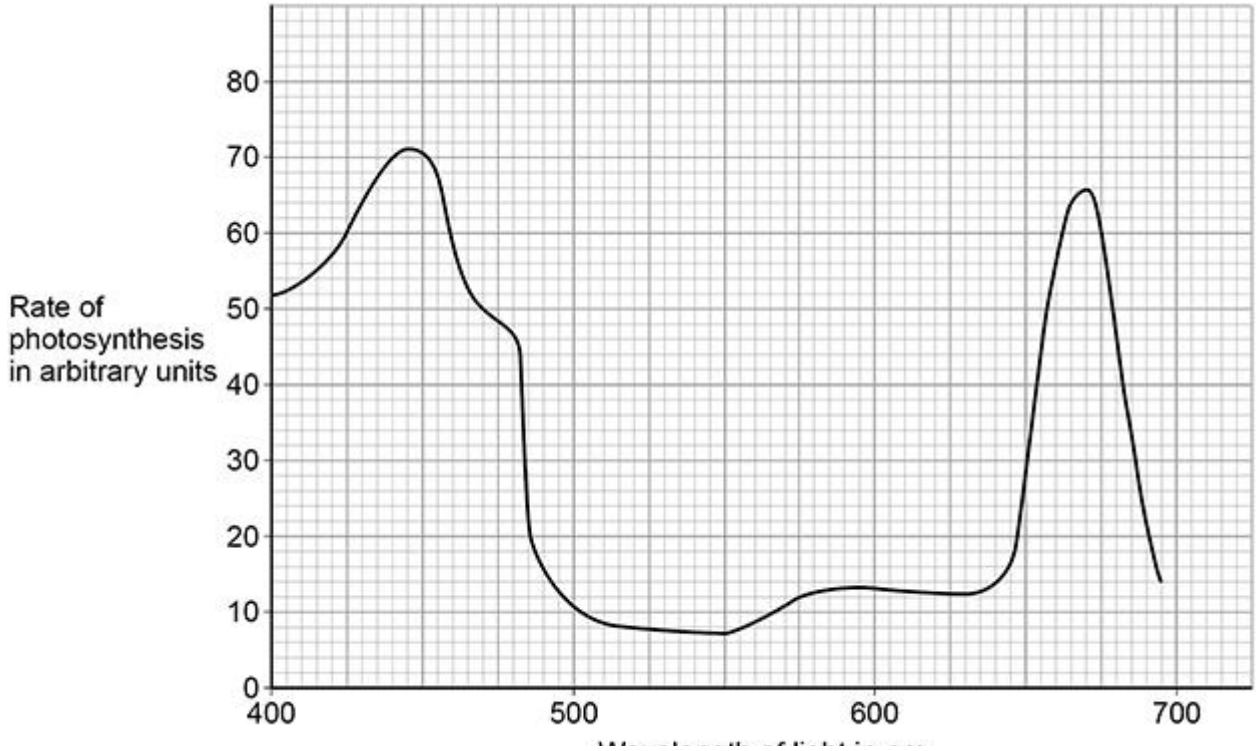

(d) Why are the results for the two investigations presented differently?

_____

_____

_____

_____

_____

(2)

(e) Suggest the range in wavelength of green light.

Use **Figure 1** and **Figure 2**.

Range in wavelength of green light = from _____ nm to _____ nm

(1)

(Total 9 marks)

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