2021 ASSESSMENT MATERIALS

# GCSE
# BIOLOGY

## Biology Test 2: Infection and response and Bioenergetics (Foundation)

Total number of marks: 32

**0 7** This question is about photosynthesis.

**0 7 . 1** Complete the word equation for photosynthesis.

**[2 marks]**

carbon dioxide + water → glucose + oxygen

Students investigated the effect of temperature on the rate of photosynthesis.

The students shone light from a lamp onto pondweed and measured the volume of oxygen produced per hour.

**Table 3** shows the results.

**Table 3**

| Temperature in °C | Rate of photosynthesis in $cm^3$/hour | | | |
|---|---|---|---|---|
| | Test 1 | Test 2 | Test 3 | Mean |
| 20 | 18.5 | 19.3 | 19.5 | **X** |
| 25 | 32.6 | 34.1 | 32.9 | 33.2 |
| 30 | 41.9 | 45.2 | 44.9 | 44.0 |
| 35 | 38.6 | 39.8 | 44.0 | 40.8 |
| 40 | 23.1 | 20.5 | 22.4 | 22.0 |
| 45 | 1.9 | 14.2 | 2.2 | 2.1 |

**0 7 . 3** Calculate mean value **X**.

$\frac{18.5+19.3+19.5}{3} = 19.1$

**[2 marks]**

**X** = 19.1 cm³/hour

The students identified one anomalous result in **Table 3**.

**0 7 . 4** Draw a ring around the anomalous result in **Table 3**.

**[1 mark]**

**0 7 . 5** Suggest **one** possible cause of the anomalous result.

There is an error when reading the volume of oxygen produced.

**[1 mark]**

**0 7 . 6** How did the students deal with the anomalous result?

ignore the anomalous result when calculating the mean

**[1 mark]**

**0 7 . 7** Give **one** factor the students should have kept constant in this investigation.

use the same piece of pondweed each time

**[1 mark]**

**Table 3** is repeated below.

**Table 3**

| Temperature in °C | Rate of photosynthesis in $cm^3$/hour | | | |
|---|---|---|---|---|
| | **Test 1** | **Test 2** | **Test 3** | **Mean** |
| 20 | 18.5 | 19.3 | 19.5 | **X** |
| 25 | 32.6 | 34.1 | 32.9 | 33.2 |
| 30 | 41.9 | 45.2 | 44.9 | 44.0 |
| 35 | 38.6 | 39.8 | 44.0 | 40.8 |
| 40 | 23.1 | 20.5 | 22.4 | 22.0 |
| 45 | 1.9 | 14.2 | 2.2 | 2.1 |

**0 7 . 8** Why did the rate of photosynthesis decrease from 35 °C to 45 °C?

**[1 mark]**

The enzymes involved in photosynthesis is denatured

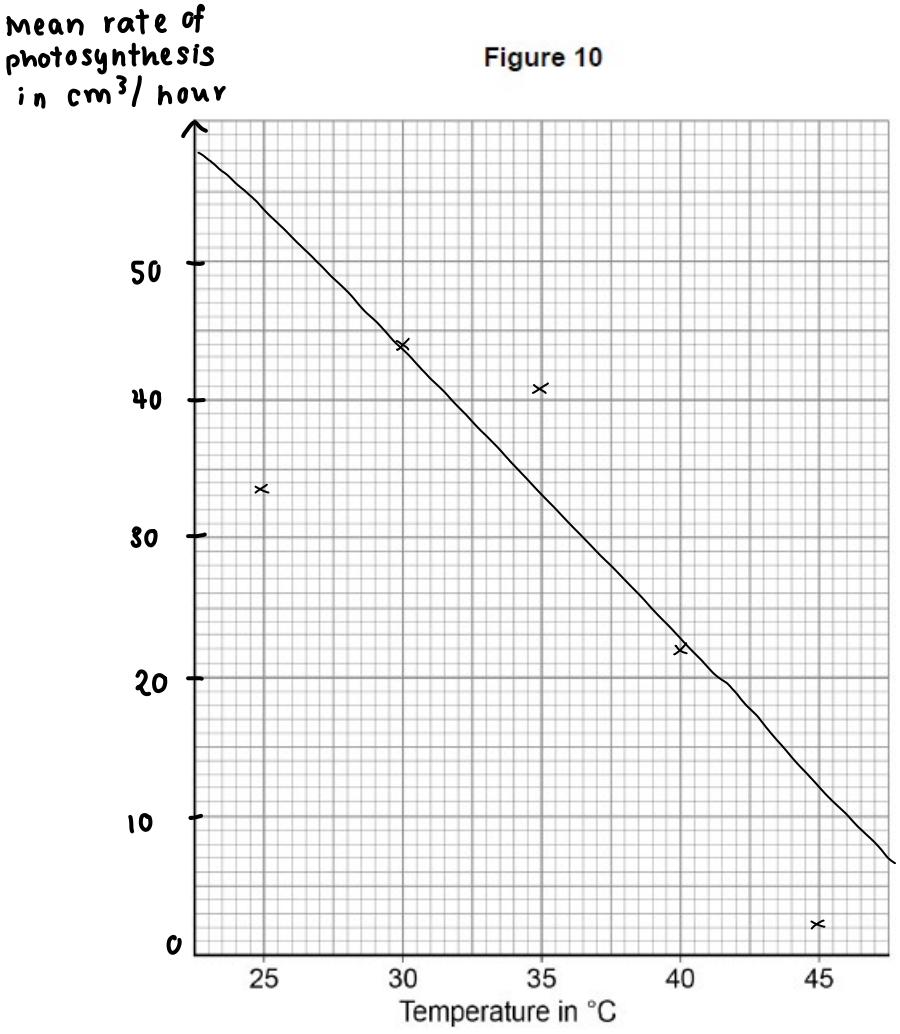
0 7 . 9 Complete **Figure 10** using data from **Table 3**.

You should:

- label the y-axis
- use a suitable scale for the y-axis
- plot the mean data from **Table 3** for temperatures from 25 °C to 45 °C
- draw a line of best fit.

**[5 marks]**

**Figure 10**



**0 7** Glucose is broken down in respiration.

**0 7 . 1** What is the chemical formula for glucose?

**[1 mark]**

Tick **one** box.

$C_6H_6O_6$ ☐

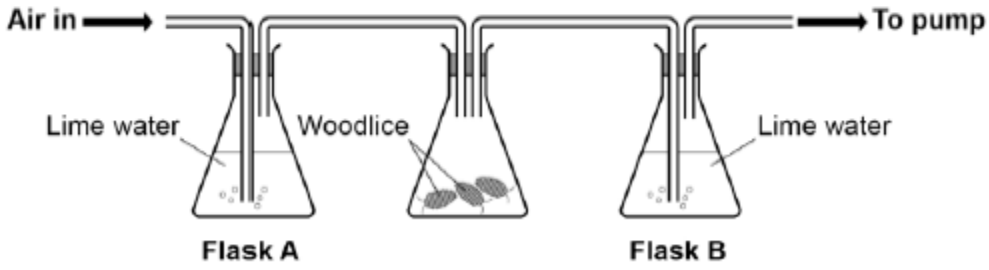
$C_3H_6O_3$ ☐

$C_6H_{12}O_6$ ✓

$C_6H_{10}O_6$ ☐

**Figure 12** shows the apparatus a student used to investigate aerobic respiration.

**Figure 12**




Limewater goes cloudy when carbon dioxide is added to it.

**0 7 . 2** After 10 minutes the limewater in flask B was cloudy, but the limewater in flask A remained colourless.

Explain why.

carbon dioxide is produced by woodlice and diffused into flask B. **[2 marks]**

**0 7 . 3** Flask A acts as a control in this investigation.

What is the purpose of a control?

To show what will normally happen and compare to the results of the main experiment **[1 mark]**

**0 7 . 4** The student repeated the investigation with no woodlice.

Describe the appearance of the limewater in flask A and flask B after 10 minutes.

limewater remains colourless in both flasks **[2 marks]**

Anaerobic respiration is another form of respiration in living organisms.

**0 7 . 5** What is produced during anaerobic respiration in humans?

**[1 mark]**

Tick one box.

| | |
|---|---|
| Carbon dioxide | ☐ |
| Carbon dioxide and lactic acid | ☐ |
| Lactic acid | ✓ |
| Oxygen and water | ☐ |

**0 7 . 6** Complete the equation for anaerobic respiration in yeast.

**[1 mark]**

glucose ⟶ carbon dioxide + ethanol

**0 8** Mosquitoes carry a pathogen that causes malaria.

**0 8 . 1** What type of pathogen causes malaria?

**[1 mark]**

Tick (✓) **one** box.

A bacterium ☐

A fungus ☐

A protist ✓

A virus ☐

Mosquito nets can help prevent the spread of malaria.

**Table 7** shows the results of a study in one area of Africa.

**Table 7**

| Total number of people in the study | Number of people who use mosquito nets when sleeping | Percentage of people with malaria | |
|---|---|---|---|
| | | Who use mosquito nets when sleeping | Who do NOT use mosquito nets when sleeping |
| 476 | 426 | 1.2 | 40 |

A newspaper made the following statement:

'Study shows mosquito nets are scientifically proven to prevent malaria.'

**0 8 . 2** Give **one** piece of evidence that supports the statement.

The percentage of people with malaria is lower in people who use mosquito nets when sleeping.

**[1 mark]**

**0 8 . 3** Suggest **one** reason why the statement may **not** be valid.

There might other variables affecting the study other than the use of mosquito net.

**[1 mark]**

0 8 . 5 Use of mosquito nets has helped to reduce the number of deaths from malaria each year.

Suggest **one** other reason for the reduced number of deaths from malaria each year.

use of mosquito repellent **[1 mark]**

0 8 . 6 Describe how the human body:

- prevents pathogens from entering
- defends itself against pathogens inside the body.

**[6 marks]**

The skin acts as a physical barrier which prevent pathogens from entering. The eyes produce tears which contains enzymes, which act as a chemical barrier. The nose contains internal hair which blocks pathogens from entering. In the trachea, goblet cells produce mucus which traps pathogens, and ciliated cells help to move the mucus upwards to the throat where it is coughed out or swallowed into the stomach where pathogens are digested by enzymes.

Phagocytes bind to pathogens and engulf them by phagocytosis. Pathogens are digested by intracellular enzymes. Lymphocytes recognise antigens on the surface of pathogens and produce specific antibodies. They also produce antitoxins which neutralise the toxins produced by pathogens.