Cambridge IGCSE

Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME

SOLVED BY SMART EXAM RESOURCES-SMART EDU HUB

CENTRE NUMBER

CANDIDATE NUMBER

BIOLOGY

0610/62

Paper 6 Alternative to Practical

May/June 2019

1 hour

Candidates answer on the Question Paper.

No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.

Electronic calculators may be used.
You may lose marks if you do not show your working or if you do not use appropriate units.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

This syllabus is regulated for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **11** printed pages and **1** blank page.

DC (ST/CT) 170508/4

Cambridge Assessment International Education

[Turn over

1 Anaerobic respiration in yeast causes the blue dye, methylene blue, to become colourless.

A student investigated the effect of temperature on the rate of respiration in yeast.

Step 1 7 cm^3 of a yeast suspension was put into a test-tube labelled **warm**. The test-tube was then placed into a beaker of warm water. The temperature of the water in the beaker was 45 °C.

Step 2 7 cm^3 of a yeast suspension was put into a test-tube labelled **cool**. The test-tube was then placed into a beaker of cool water. The temperature of the water in the beaker was 20 °C.

Step 3 After three minutes, the student added five drops of methylene blue dye to the yeast suspensions in each of the test-tubes. The yeast suspensions became blue in both test-tubes.

Step 4 A layer of vegetable oil was carefully poured on top of the yeast suspension in each of the test-tubes, as shown in Fig. 1.1.

The layer of oil stopped air from reaching the yeast cells in the suspension so that the conditions were anaerobic

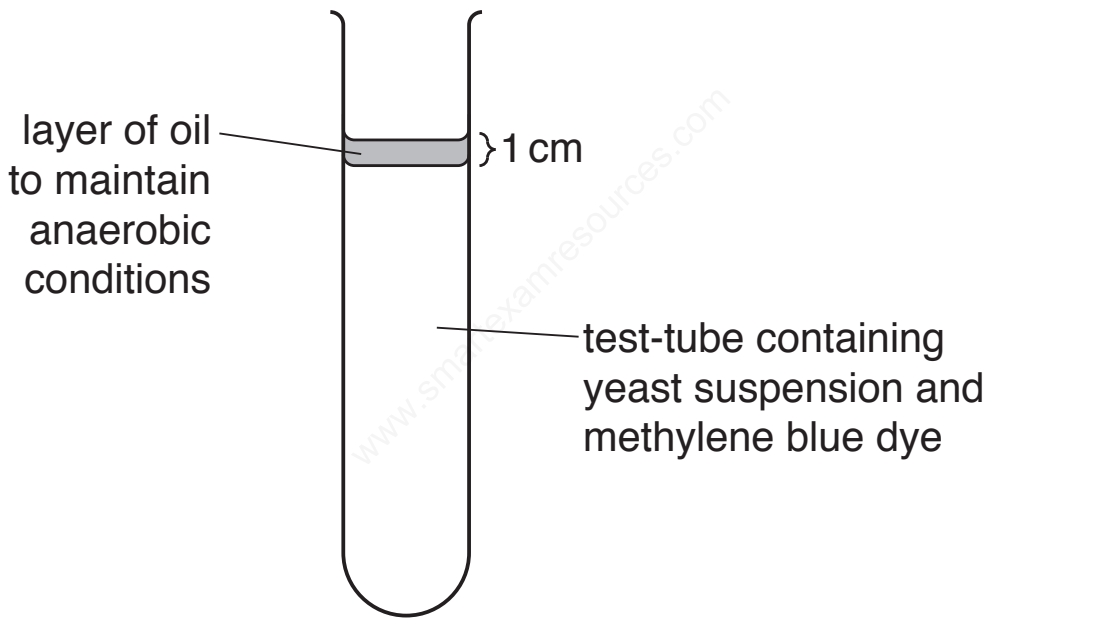

Fig. 1.1

Step 5 A stop-clock was started.

Step 6 The student observed the **warm** and **cool** test-tubes. When they could no longer see the blue colour they recorded the time taken for the blue colour to disappear.

Fig. 1.2 shows the time on the stop-clock for each test-tube at the end of step 6.

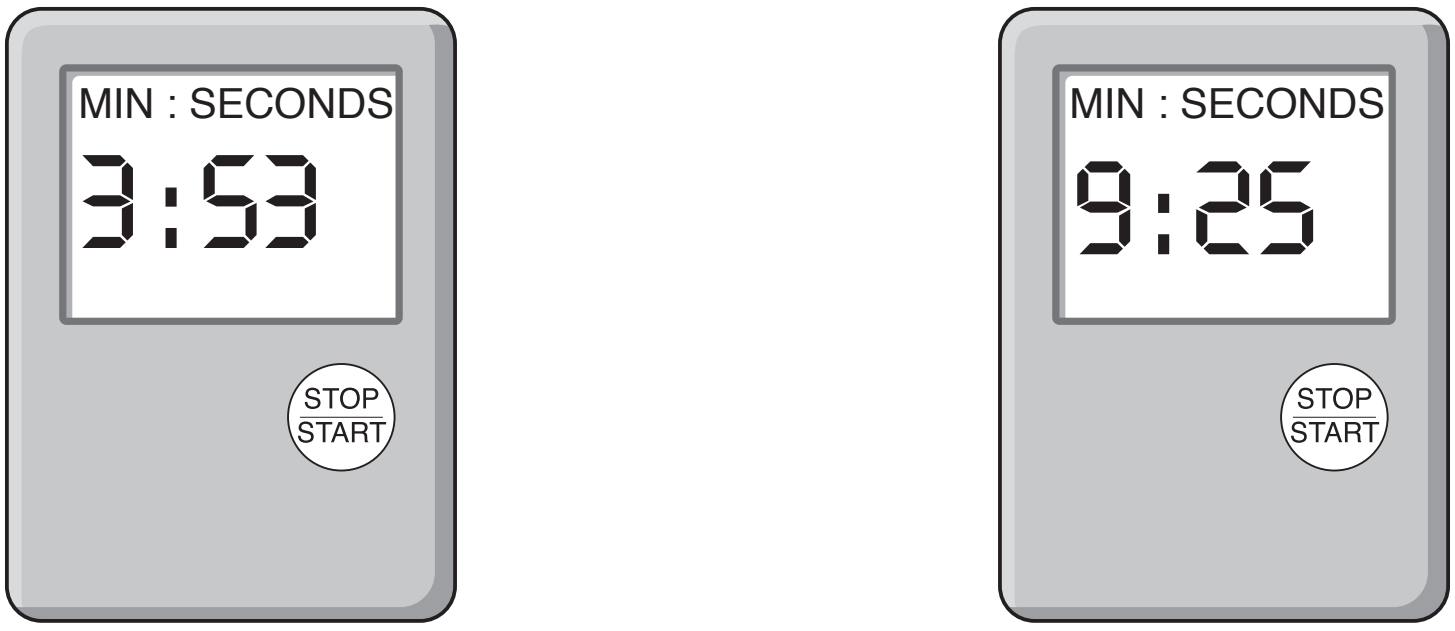

Fig. 1.2

(a) **(i)** Prepare a table to record the results.

Convert the times shown in Fig. 1.2 to seconds and record them in your table.

Type of tube	Time taken for the methylene blue to change colour/s
warm	233
Cold	565

[3]

(ii) State a conclusion for the results in your table in **1(a)(i)**.

At higher temperatures the methylene blue became colourless

[1]

Step 7 The student used a thermometer to measure the temperatures of the warm water beaker and the cool water beaker at the end of the investigation.

Fig. 1.3 shows the temperatures on the thermometer at the **end** of the investigation.

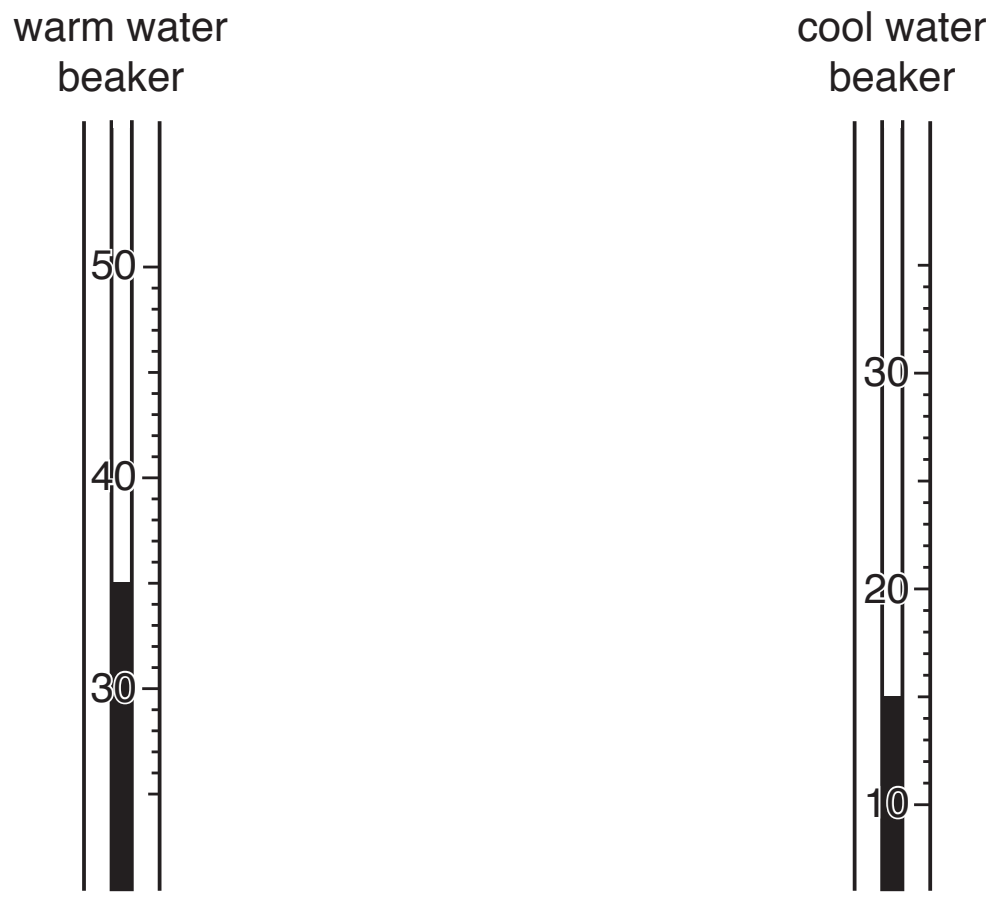

Fig. 1.3

(iii) Complete Table 1.1 by recording the temperatures in the beakers at the start and at the end of the investigation.

Table 1.1

beaker	temperature at the start / °C	temperature at the end / °C
warm water	45	35
cool water	20	15

[1]

(iv) Identify the variable that was changed (independent variable) in this investigation.

Temperature
..... [1]

(v) Identify **two** variables that were kept constant in this investigation.

1 Type of yeast .....

2 Type of oil .....

[2]

(b) (i) Identify **one** possible source of error in step 6 and suggest an improvement for this error.

error Difficult to jusde when the colour had disappeared .....

.....

improvement Compare to, a test-tube containing yeast with no methylene blue .....

.....

.....

[2]

(ii) The data you have recorded in Table 1.1 may indicate that there is a source of error with the method used in this investigation.

Identify the possible error and suggest an improvement to the method to reduce the effect of this error.

error The temperature of the water-bath is not controlled .....

.....

improvement Use a thermostatically controlled water-bath .....

.....

.....

[2]

(c) Anaerobic respiration in yeast produces a gas.

State the name of an indicator which could be used to show that the gas is carbon dioxide and state the expected result.

indicator hydrogen carbonate .....

expected result yellow .....

[2]

(d) Anaerobic respiration in yeast cells also produces ethanol. In high concentrations ethanol can slow down the rate of respiration.

Plan an investigation to determine the effect of different concentrations of ethanol on the rate of respiration in yeast cells.

Wear safety gloves and goggles. Take the same type of yeast in two different boiling tubes. Add equal amount of sugar to each of the boiling tubes. Next add equal volumes of two different concentrations of ethanol to each of the boiling tubes. One tube with a very high concentration and the other with a very low concentration. Keep the temperature of both the boiling tubes constant by suspending the tubes in the same water bath. Add the same amount of methylene blue indicator to both the test tubes and cover them with drops of oil to stop air and help the yeast respire anaerobically. Observe the colour changes to the methylene blue in a fixed tine interval. Repeat the above experiment and note down the general trend. Also the same experiment can be done without adding any ethanol to the boiling tubes. The time taken for the methylene blue to change to colourless may be recorded. This may also be repeated again to confirm the findings. Make comparisons and then draw conclusions.

..... [6]

[Total: 20]

7

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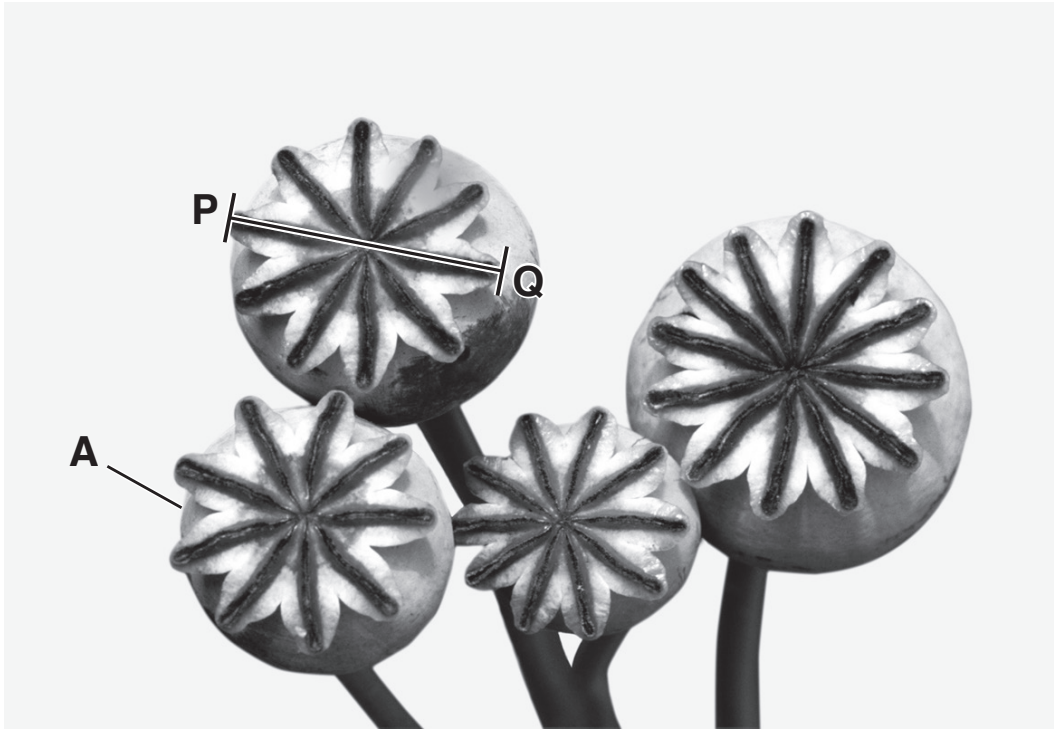
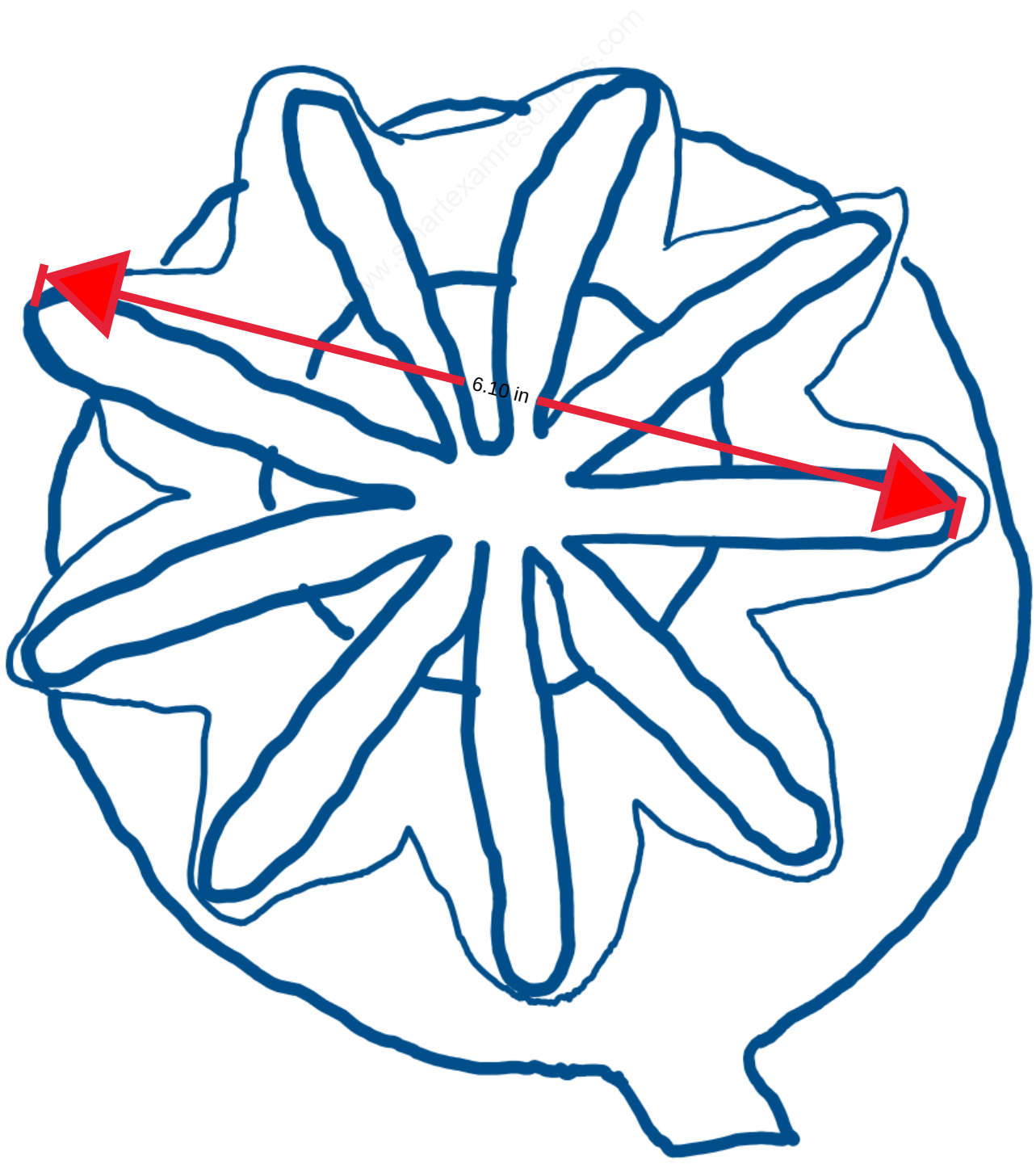
2 **(a)** Fig. 2.1 is a photograph showing four seed heads from a poppy plant.



magnification ×1.6

Fig. 2.1

(i) Draw a large diagram of the seed head labelled **A**.



[4]

(ii) Measure the length of line **PQ** on Fig. 2.1. Include the unit.

length of line **PQ** .....26mm.....

Calculate the actual size of the seed head using the formula and your measurement.

$$\text{magnification} = \frac{\text{length of line } \mathbf{PQ}}{\text{actual diameter of the seed head}}$$

Give your answer to the nearest whole number and include the unit.

Show your working.

1.6=2.6/Actual diameter
Actual diameter=2.6/1.6=2cm

2cm

.....

[3]

(b) A student investigated the effect of pH on the germination of seeds. The student planted 25 seeds for each pH value.

The results of the investigation are shown in Table 2.1.

Table 2.1

pH	number of seeds that germinated	percentage of seeds that germinated
4	20	80
5	23	92
6	24	96
7	19	76
8	15	60
9	10	40

(i) Calculate the percentage of seeds that germinated at pH8.

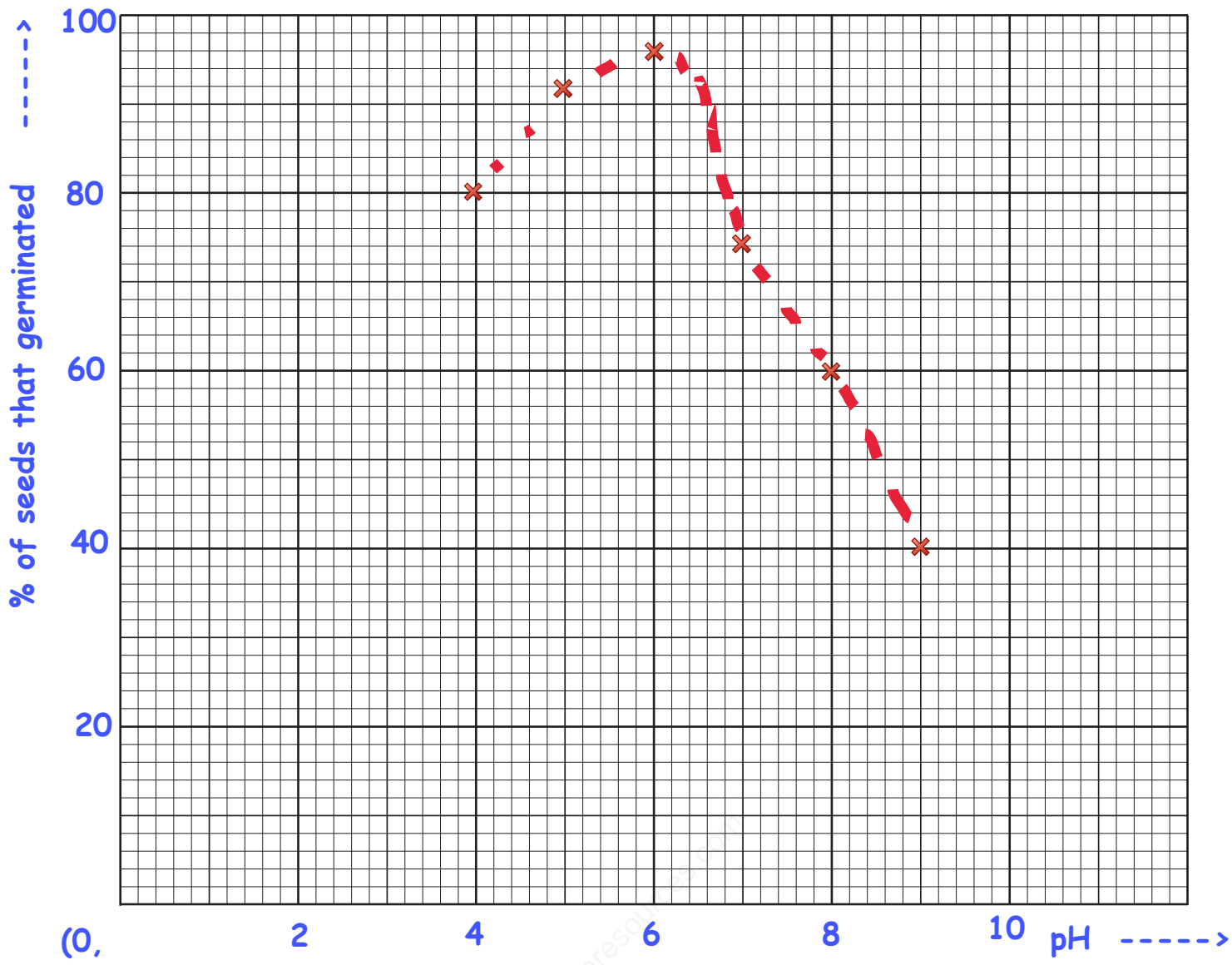
Show your working.

(15 × 100)/25=60%

60 ..... %

[2]

(ii) Plot a line graph on the grid to show the effect of pH on the percentage of seeds that germinated using the data in Table 2.1.



[4]

(iii) Describe the effect of pH on the percentage of seeds that germinated shown in your graph.

1. The germination percentage increases then decreases.
2. The peak is at pH 6

.....

.....

.....

..... [2]

(iv) The student wanted to obtain a more accurate value for the optimum (best) pH for the germination of seeds.

Suggest further investigative work that the student should carry out.

1. Test the pH values at smaller interval between pH 5 and pH 7

.....

.....

.....

.....

..... [2]

(c) During germination the starch within seeds is broken down to form reducing sugars.

Describe how you could test a sample of germinating seeds to find out if reducing sugars are present.

We would grind up seeds and then add Benedict's solution to it and then heat it.
If red / orange / yellow / green colour is observed then reducing sugar is present.

..... [3]

[Total: 20]