Adabistan-e-Soophia

General Certificate of Education Ordinary Level 3 **(Test 1)**

.Adabistan-e-Soophia
School for Boys & Girls

CANDIDATE NAME	

CENTER NUMBER						CANDIDATE NUMBER						

Biology **5090/01**

Paper VI

Session 2020-21

Time **30** minutes

Marks 20

Candidates answer on the enclosed Answer Booklet.
Additional Materials: *Answer Booklet/Paper*

If you have been given an Answer Booklet, follow the instructions on the front cover of the Booklet. 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 a soft pencil for any diagrams or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer all questions.

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.

1. Fig. 2.1 shows a honey bee, *Apis mellifera*.

Fig. 2.1

a) Make a labelled drawing of the back leg of the honey bee shown in Fig. 2.1.

[3]

Honey bees are important in pollination when they gather nectar from flowers.
The nectar is used for making honey.
Honey contains pollen grains which identify the flowers that the nectar was gathered from.

Fig. 2.2 shows some pollen grains in a sample of honey as seen with a microscope.

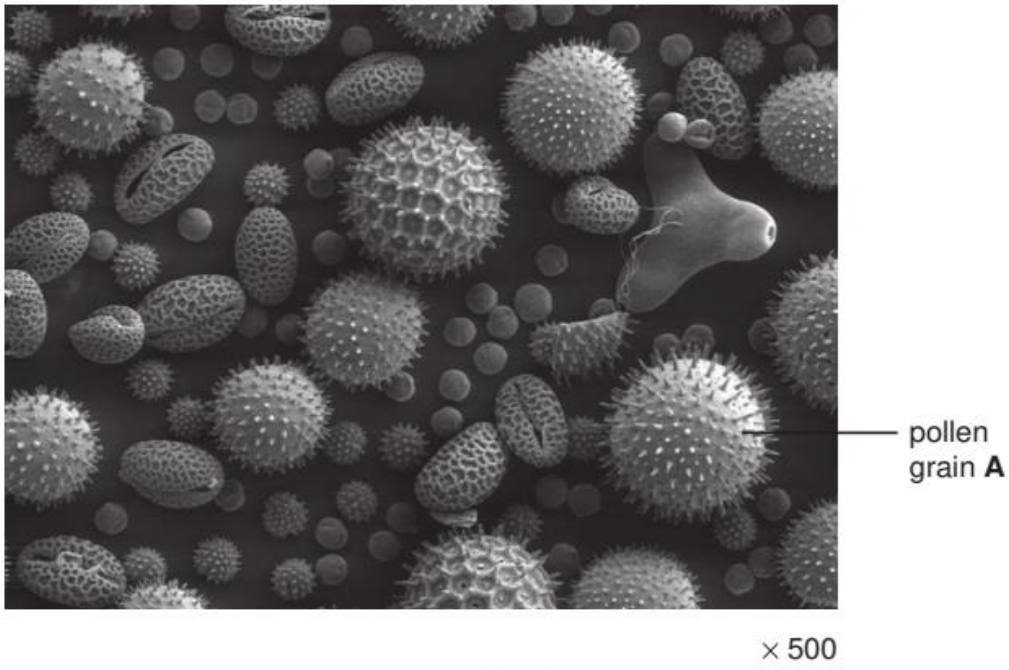

Fig. 2.2

b) **(i)** Measure the diameter of pollen grain **A**. Draw a line on Fig. 2.2 to show where you have made your measurement.

diameter of pollen grain **A** in Fig. 2.2 ..... mm [1]

(ii) Calculate the actual diameter of pollen grain **A**. Show your working.

actual diameter of pollen grain **A** ..... mm [1]

c) Describe how you could safely test a sample of honey for starch and reducing sugar:

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.....

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..... [2]

[Total: 7]

2. Fruits such as apples and bananas contain chemicals called polyphenols. An enzyme, polyphenol oxidase, is also present. It catalyses a reaction which converts the polyphenols into brown-coloured compounds.

This reaction happens when the cells are damaged and exposed to oxygen in the air.

$$\text{polyphenols + oxygen} \xrightarrow{\text{polyphenol oxidase}} \text{brown-coloured compounds}$$

Some students investigated the effect of pH on the enzyme polyphenol oxidase in apples.

The students were provided with one apple, distilled water and four solutions labelled **B**, **C**, **D** and **E**. Each solution had a different pH.

Step 1 Five Petri dishes were labelled **A**, **B**, **C**, **D** and **E**.

Step 2 20 cm^3 of distilled water was added to Petri dish **A**.

Step 3 20 cm^3 of solution **B** was poured into the Petri dish labelled **B**.

Step 4 Step 3 was repeated using solutions **C**, **D** and **E** and the Petri dishes labelled **C**, **D** and **E**.

Step 5 Universal Indicator paper and a pH colour chart were used to find the pH of each of the solutions in the five Petri dishes.

Step 6 Six slices were cut from an apple and put on to separate white tiles. The apple slices were cut to approximately the same size.

Step 7 Each apple slice was chopped into small pieces and then crushed with a spatula.

Step 8 One of the crushed apple slices was put into each of the solutions in Petri dishes **A**, **B**, **C**, **D** and **E**. A lid was put on to each of the Petri dishes and they were left for two minutes.

Step 9 The crushed apple from the remaining slice was left uncovered, on the white tile and was labelled **control**.

Step 10 The lid of Petri dish **A** was removed and the liquid was poured away, leaving only the crushed apple in the Petri dish. **The Petri dish lid was not replaced.**

Step 11 Step 10 was repeated for Petri dishes **B**, **C**, **D** and **E**.

Step 12 The students looked at the colour of the crushed apple slice in each Petri dish at 0 minutes, 10 minutes and 20 minutes.

The students used the key shown in Table 1.1 to identify the colour intensity value for each crushed apple slice.

Table 1.1

colour of the crushed apple slice	no brown colour	light brown	dark brown
colour intensity value	1	2	3

Fig. 1.1 shows the students' results.

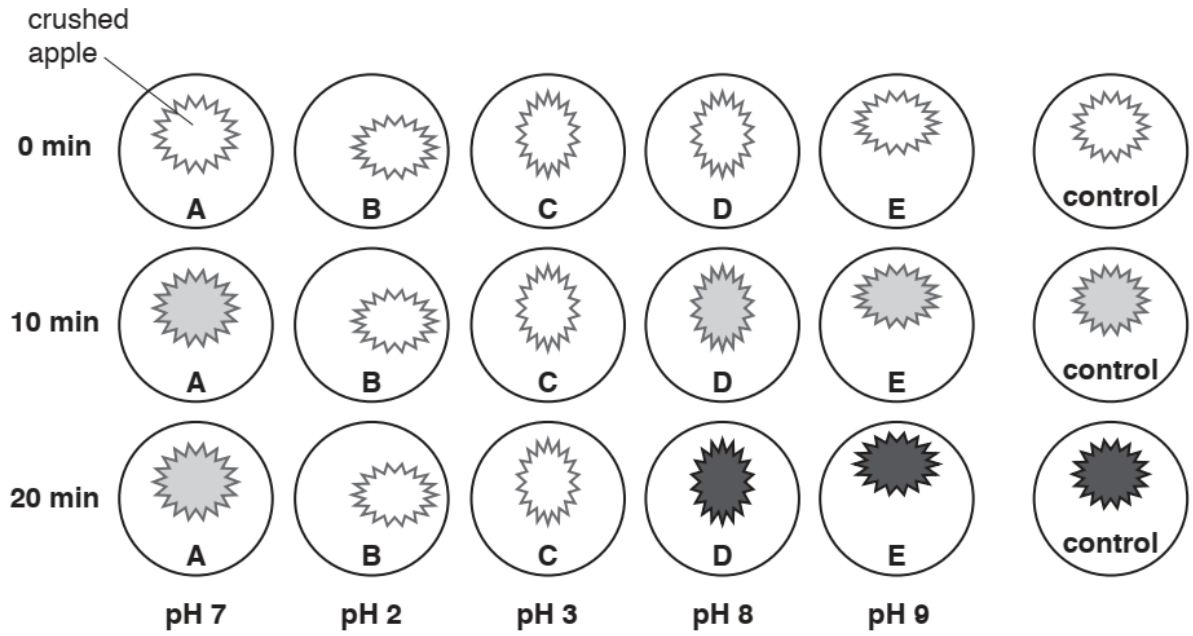

Fig. 1.1

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

Your table should include:
- the colour intensity value for the crushed apple slices
- the pH of each solution.

[3]

(ii) State the purpose of the control set up in step 9.

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..... [1]

Table 1.2 shows the pH of some household products.

Table 1.2

household product	olive oil	lemon juice	milk	water	salt water	baking soda
pH	no value	2.0	6.6	7.0	7.6	9.0

(iii) Suggest which of the household products in Table 1.2 should be used to prevent cut apples from going brown. Explain your choice.

household product .....

explanation .....

..... [1]

b) **(i)** State **one** variable that was kept constant in the investigation described.

Describe how this variable was kept constant.

variable .....

how it was kept constant .....

..... [1]

(ii) Explain why the lids were not put back on to the Petri dishes after the solutions were poured away in steps 10 and 11.

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..... [1]

(iii) State the main hazard in steps 6 and 7 and describe how to reduce the risk of this hazard.

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..... [1]

c) Explain why the method used to find the colour intensity value for the crushed apple slices in step 12 is a source of error.

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..... [1]

d) Identify **one** source of error in steps 6, 7 or 8 and suggest an improvement for this error.

source of error .....

.....

improvement .....

.....

..... [1]

e) In another experiment, enzymes were extracted from two different fruits.

These enzyme extracts were heated at 65 °C for a total of 60 minutes.

During this time samples were removed every 15 minutes.

The samples were tested to find out how much enzyme activity remained.

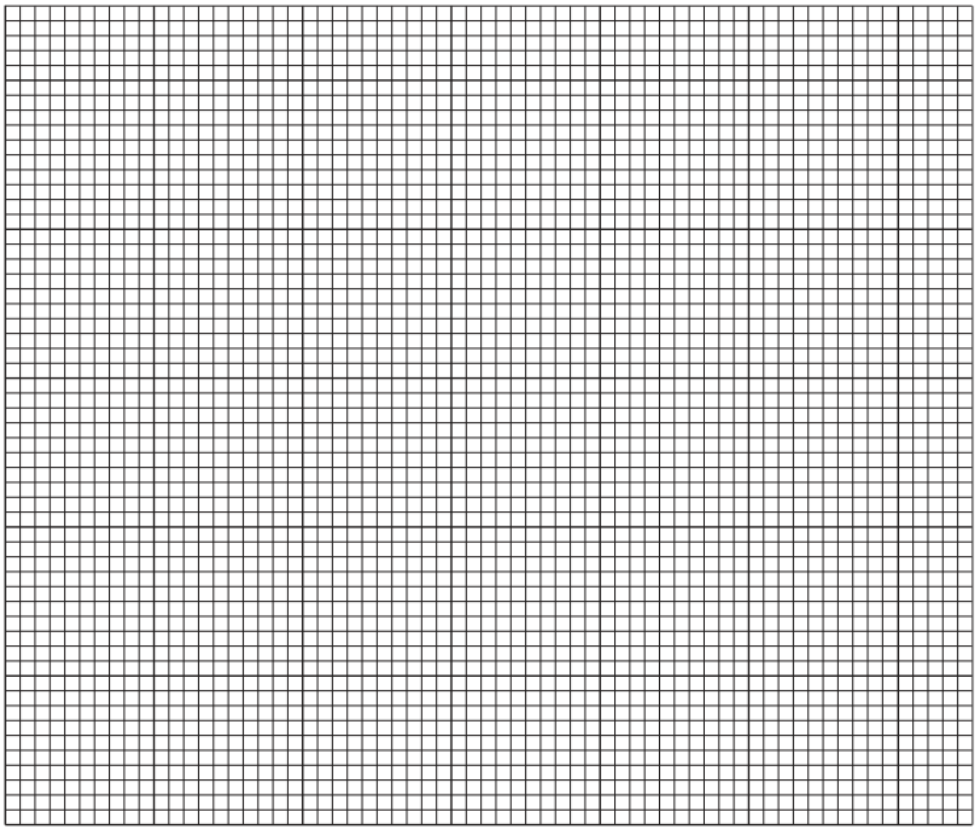
Table 1.3 shows the results of the experiment.

Table 1.3

sample time /min	percentage of enzyme activity remaining	
	apricot	avocado
0	100	100
15	5	40
30	0	25
45	0	20
60	0	10

f) **(i)** Plot a line graph on the grid of enzyme activity against sample time.

You should plot the data for the apricot and for the avocado.



[2]

(ii) State a conclusion for these results.

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.....[1]

[Total: 13]