Please write clearly in block capitals.

Centre number | | | | | | Candidate number | | | | |

Surname _____

Forename(s) _____

Candidate signature _____

I declare this is my own work.

Level 3 Certificate/Extended Certificate
APPLIED SCIENCE

Unit 1 Key Concepts in Science
Section A – Biology

Time allowed: 1 hour 30 minutes.
You are advised to spend approximately 30 minutes on this section.

Materials
For this paper you must have:
- a calculator
- the Formulae Sheet (enclosed).

Instructions
- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions in each section.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).
- Do all rough work in this book. Cross through any work you do not want to be marked.

For Examiner's Use	
Question	Mark
1	
2	
3	
TOTAL	

Information
- You will be provided with a copy of the Formulae Sheet.
- There are three sections in this paper:
  Section A – Biology **Section B** – Chemistry **Section C** – Physics.
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 60 and the maximum mark for this section is 20.

Advice
Read each question carefully.

Do not write outside the box

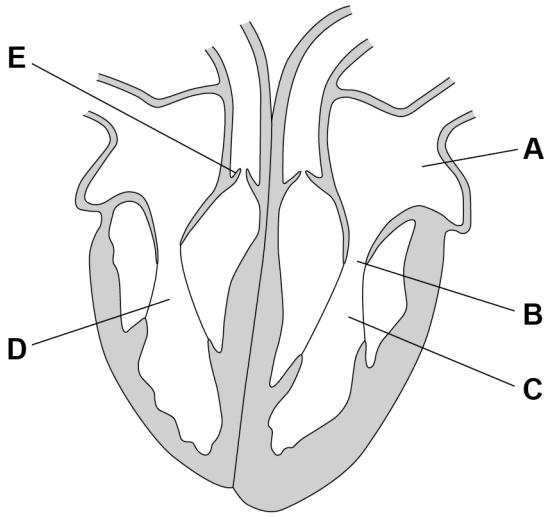
Section A – Biology

Answer **all** the questions in this section.

0 1 This question is about the heart.

Figure 1 shows the structure of the heart.

Figure 1



0 1 . 1 Which part of the heart is the left ventricle?

[1 mark]

Tick (✓) **one** box.

A ☐

B ☐

C ☐

D ☐

E ☐

Do not write outside the box

0 1 . 2 Which part of the heart is the bicuspid valve?

[1 mark]

Tick (✓) **one** box.

A ☐

B ☐

C ☐

D ☐

E ☐

0 1 . 3 Define the term **arrhythmia**.

[1 mark]

0 1 . 4 Some people have an artificial pacemaker fitted.

Explain how an artificial pacemaker controls heart rate.

[3 marks]

Question 1 continues on the next page

Do not write outside the box

0 1 . 5 During each heart beat the pressure in the blood vessels increases.

If blood pressure becomes too high the resting heart rate decreases.

Describe how the increase in blood pressure is detected by the body.

[2 marks]

8

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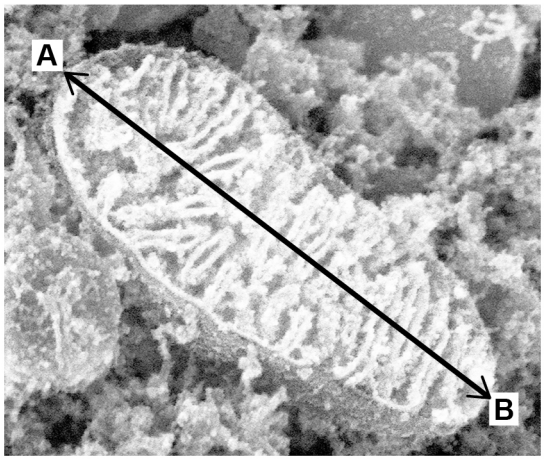
0 2 Most eukaryotic cells have mitochondria.

0 2 . 1 Give **one** other structure found in eukaryotic cells that is **not** found in prokaryotic cells.
[1 mark]

Figure 2 shows a mitochondrion seen through an electron microscope.

Figure 2



0 2 . 2 Line **A**–**B** in **Figure 2** shows the length of the mitochondrion.

The magnification of the image is 73 000

Calculate the actual size of the mitochondria in **Figure 2** in micrometres (μm).

Use the equation:

$$\text{actual size} = \frac{\text{observed size}}{\text{magnification}}$$

[2 marks]

Actual size of mitochondria = _____ μm

Question 2 continues on the next page

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0 2 . 3 All cells need energy from respiration.

There are different stages in respiration.

Where in a cell do the electron transfer chain and glycolysis take place?

Complete **Table 1**.

[2 marks]

Table 1

Stage of respiration	Where in a cell the stage takes place?
Electron transfer chain	
Glycolysis	

5

Do not write outside the box

0 3 Photosynthesis is a process that occurs in plants.

A student investigated the effect of light on photosynthesis in plant leaves.

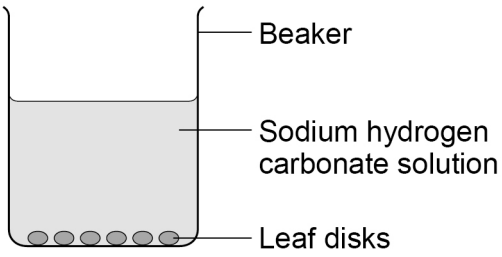
This is the method used.

1 Cut 10 small disks from a leaf.
2 Place the leaf disks in a beaker of sodium hydrogen carbonate solution.
3 Wait until all the leaf disks fall to the bottom of the beaker.
4 Shine a bright light onto the beaker.

The student repeated the experiment in very dim light.

Figure 3 shows the student's experiment.

Figure 3



0 3 . 1 Name the essential raw materials needed for photosynthesis.

[1 mark]

Question 3 continues on the next page

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0 3 . 2 When a light shines onto the leaf disks, they float to the surface of the solution.

Explain why the leaf disks float when light is shining onto them.

[3 marks]

0 3 . 3 When the experiment was done in very dim light, the leaf disks did not float. The leaves were **only** carrying out the light-independent stage of photosynthesis.

Describe what happens during the light-independent stage of photosynthesis.

[3 marks]

7

END OF QUESTIONS

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DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED

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Question number	**Additional page, if required.** **Write the question numbers in the left-hand margin.**

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Question number	**Additional page, if required.** **Write the question numbers in the left-hand margin.**