AQA

Please write clearly in block capitals.

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I declare this is my own work.

Level 3 Certificate/Extended Certificate
APPLIED SCIENCE

Unit 1 Key Concepts in Science
Section A – Biology

Tuesday 21 January 2020 Morning

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
- Formulae Sheet.

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

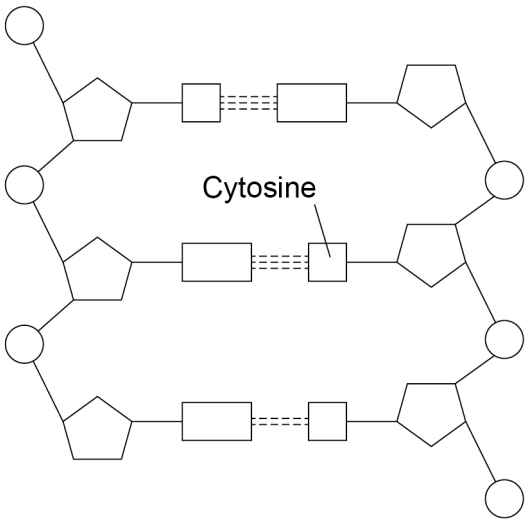
Section A – Biology

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

0 1 Biologists study the molecules that make up organisms.

Figure 1 shows part of a DNA molecule made up of nucleotides.

Figure 1



A DNA nucleotide is made of:

- a base
- a phosphate group
- a ribose sugar.

0 1 . 1 How many individual DNA nucleotides are shown in **Figure 1?**

[1 mark]

0 1 . 2 Cytosine is one of the four DNA bases.

Name **two** other DNA bases.

[2 marks]

1 _____

2 _____

Do not write outside the box

0 1 . 3 Which cell organelle uses the base sequence to produce proteins?

Tick (✓) **one** box.

[1 mark]

- Mitochondrion ☐
- Nucleus ☐
- Ribosome ☐
- Vesicle ☐

0 1 . 4 Cell organelles can become damaged.

Which cell organelle breaks down damaged cell organelles?

Tick (✓) **one** box.

[1 mark]

- Golgi apparatus ☐
- Lysosome ☐
- Nucleus ☐
- Smooth endoplasmic reticulum ☐

5

Turn over for the next question

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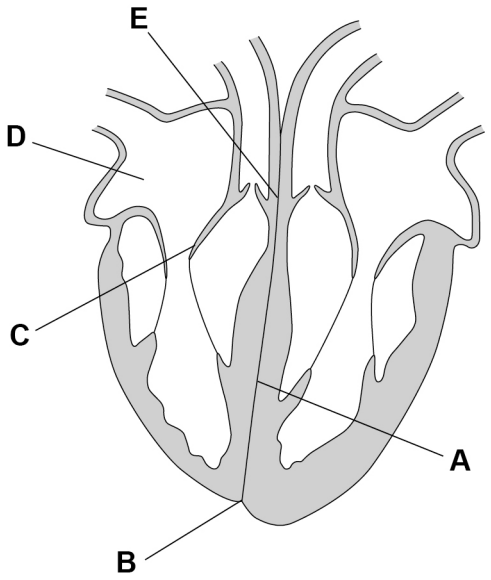
0 2 Cardiologists study the heart and circulatory system.

Figure 2 shows the structure of the human heart.

Figure 2



The heart's natural pacemaker cells initiate an electrical impulse that causes the heart muscle to contract.

The pacemaker cells are found in the sinoatrial node (SAN).

0 2 . 1 Where is the SAN in **Figure 2**?

Tick (✓) **one** box.

[1 mark]

A ☐

B ☐

C ☐

D ☐

E ☐

Do not write outside the box

0 2 . 2 The electrical impulse goes from the SAN to the atrioventricular node (AVN).

Where is the AVN in **Figure 2**?

Tick (✓) **one** box.

[1 mark]

A ☐

B ☐

C ☐

D ☐

E ☐

Chemoreceptors and baroreceptors are involved in monitoring heart rate.

0 2 . 3 Name **one** gas detected by the chemoreceptors involved in monitoring heart rate.

[1 mark]

_____

_____

0 2 . 4 What do baroreceptors respond to?

Tick (✓) **one** box.

[1 mark]

Change in blood glucose concentration. ☐

Change in blood pressure. ☐

Change in blood temperature. ☐

Change in the speed of blood flow. ☐

Question 2 continues on the next page

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Diet can affect our health.

0 2 . 5 Give **two** possible effects on our health of eating a diet high in sodium chloride (salt).

[2 marks]

1 _____

_____

2 _____

_____

0 2 . 6 Vomiting or diarrhoea can cause the loss of too much salt from the body.

Give **one** other situation that can cause the loss of too much salt from the body.

[1 mark]

_____

_____

7

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0 3 Nurses monitor breathing and respiration in patients.

0 3 . 1 Nurses measure breathing rate by counting the number of times the chest rises in 1 minute.

Give **one** method a nurse could use to see how fast a patient with asthma can exhale.

[1 mark]

0 3 . 2 Breathing and cellular respiration are different processes.

Which is a description of cellular respiration?

Tick (✓) **one** box.

[1 mark]

Respiration is physical and external. ☐

Respiration is chemical and external. ☐

Respiration is physical and internal. ☐

Respiration is chemical and internal. ☐

Question 3 continues on the next page

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0 3 . 3 Respiration has three main stages.

The final stage is called the electron transfer chain.

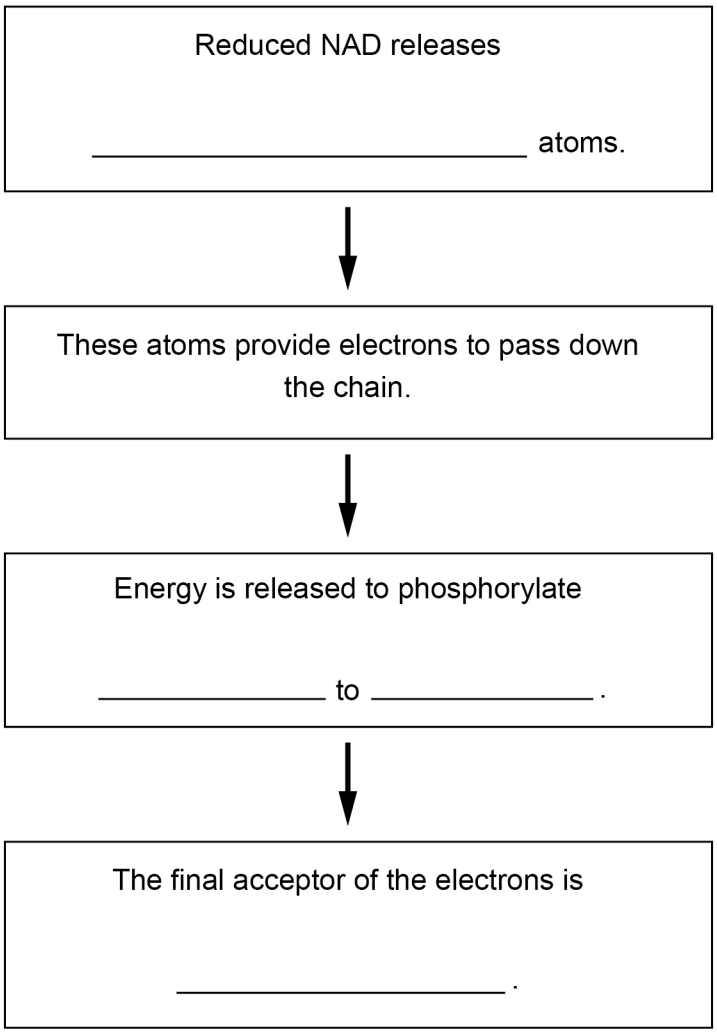
Figure 3 shows some of the steps in the electron transfer chain.

Complete the sentences in **Figure 3**.

The second one has been done for you.

[4 marks]

Figure 3



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0 3 . 4 Basal metabolic rate (BMR) is the energy needed each day to keep the body working whilst at rest.

BMR is affected by factors such as age, gender and mass.

There are two methods of measuring BMR.

Give **two** difficulties of using **direct calorimetry** to calculate the BMR of a person.

[2 marks]

1 _____

_____

2 _____

_____

8

END OF QUESTIONS

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ANSWER IN THE SPACES PROVIDED

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.**

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