A

AQA

Surname _____

Other Names _____

Centre Number _____

Candidate Number _____

Candidate Signature _____

Level 3 Certificate / Extended Certificate

APPLIED SCIENCE

Unit 1 Key concepts in science
Section A – Biology

ASC1B

Monday 11 June 2018 Afternoon

Time allowed: 1 hour 30 minutes.

You are advised to spend approximately 30 minutes on this section.

For this paper you must have:
- **a calculator**
- **formulae sheet.**

At the top of the page, write your surname and other names, your centre number, your candidate number and add your signature.

[Turn over]

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INSTRUCTIONS

- **Use black ink or black ball-point pen.**
- **Answer ALL questions in each section.**
- **You must answer the questions in the spaces provided. Do not write on blank pages.**
- **Do all rough work in this book. Cross through any work you do not want to be marked.**

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 TURN OVER UNTIL TOLD TO DO SO

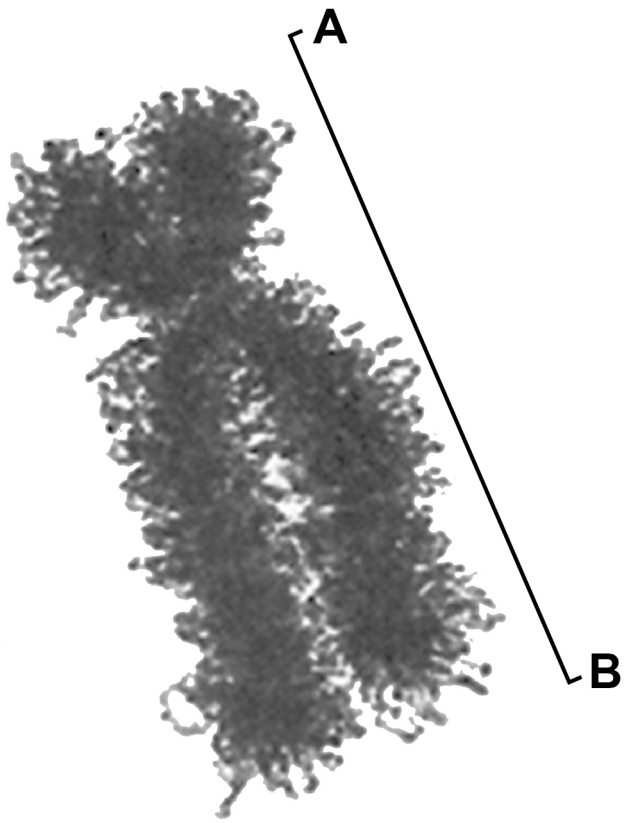
SECTION A – BIOLOGY

Answer ALL questions in this section.

0 1 **Scientists study the ultrastructure of cells using electron microscopes.**

FIGURE 1 shows a chromosome seen through an electron microscope.

FIGURE 1



0 1 . 1 **The actual size of the chromosome from A to B is 1.2 µm**

Take the length of the line AB as shown on the page to be 93 mm.

Calculate the magnification of the chromosome in FIGURE 1. [2 marks]

Magnification = _____

0 1 . 2 **Name the part of a cell where chromosomes are found. [1 mark]**

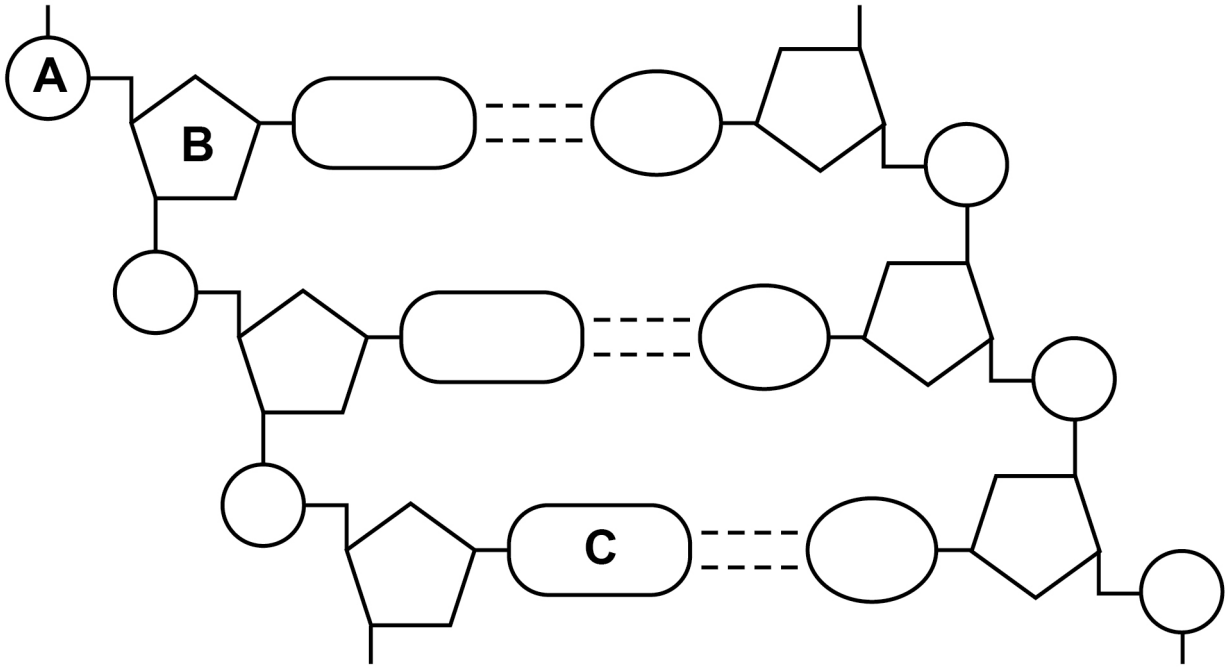
_____

_____

0 1 . 3 **Chromosomes are made of DNA.**

FIGURE 2 shows the structure of DNA.

FIGURE 2



Name parts A, B and C. [3 marks]

A _____

B _____

C _____

0 1 . 4 Some bacteria have RNA instead of DNA.

Give ONE difference in the structure of RNA compared with DNA. [1 mark]

_____

_____

_____

_____

7

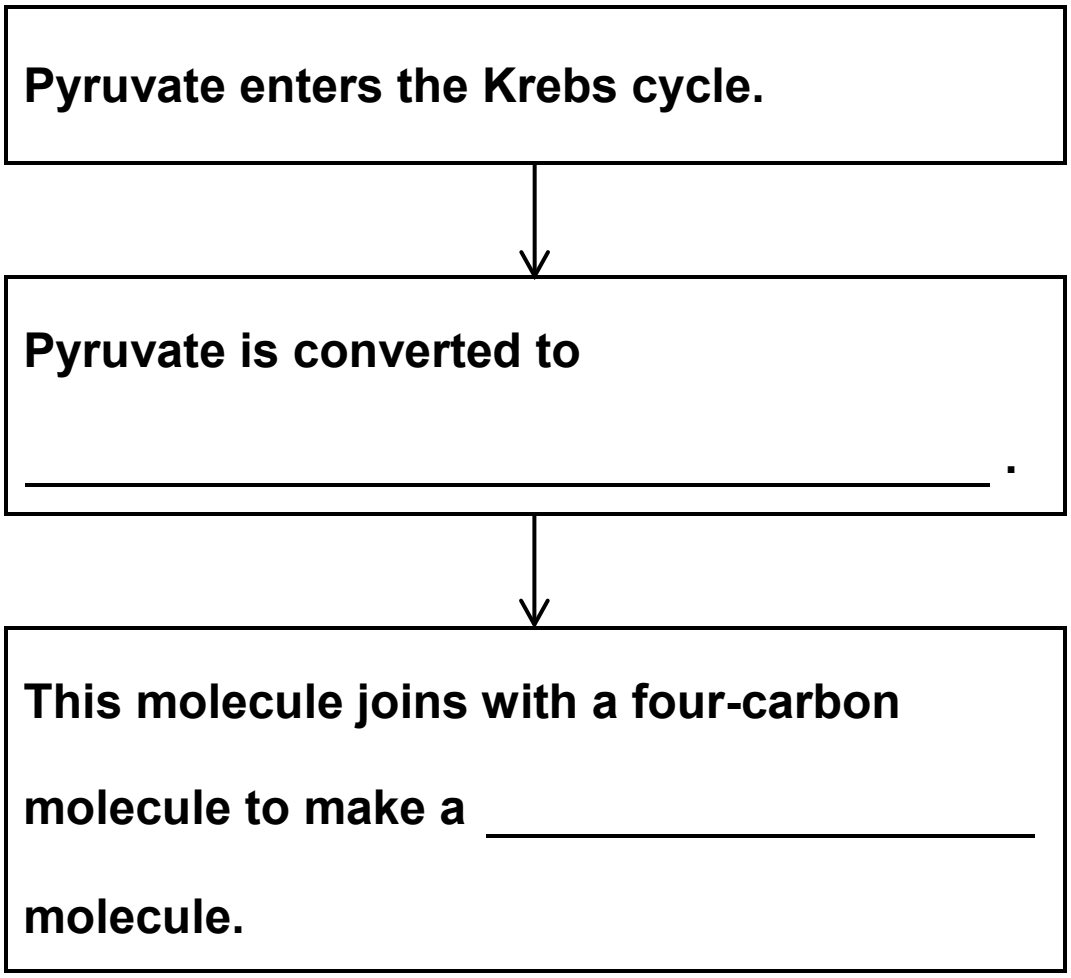
0 2 **Fumarase deficiency is a genetic disorder affecting a very small number of people.**

Fumarase is an enzyme used in the Krebs cycle.

0 2 . 1 **FIGURE 3 shows some of the steps in the Krebs cycle.**

Complete the sentences in FIGURE 3.
The first sentence has been completed for you.
[2 marks]

FIGURE 3



0 2 . 2 **ADP is converted to ATP during the Krebs cycle.**

What type of reaction makes ATP? [1 mark]

0 2 . 3 **Some people do not have enough fumarase.**

Fumarase deficiency symptoms include:

- **abnormally small head**
- **severe tiredness.**

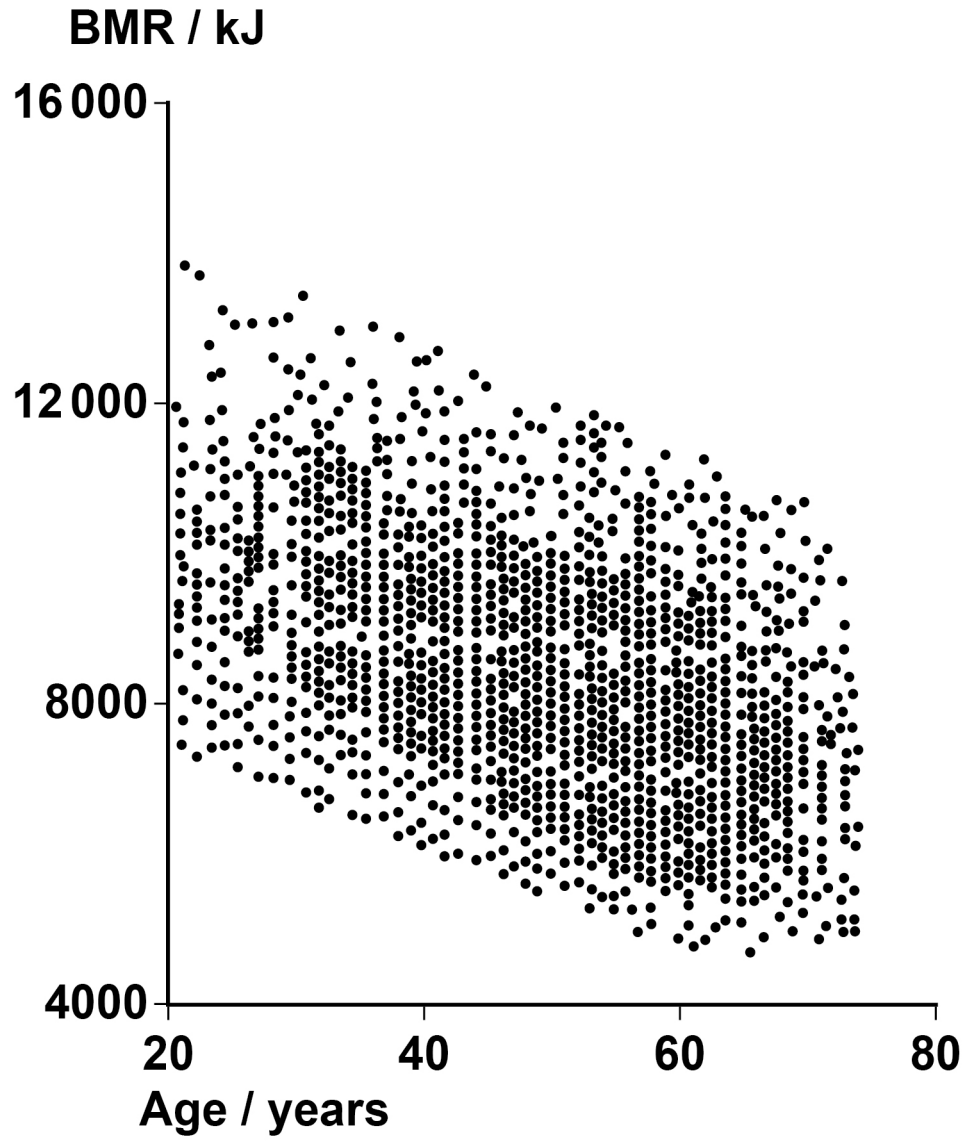
Suggest why children born with fumarase deficiency suffer from severe tiredness. [1 mark]

[Turn over]

0 2 . 4 **Basal Metabolic Rate (BMR) in people with fumarase deficiency is lower than in people without fumarase deficiency. BMR is affected by many different factors.**

FIGURE 4 shows a scatter graph of how BMR in people without fumarase deficiency changes with age.

FIGURE 4



Give ONE conclusion about BMR that FIGURE 4 shows. [1 mark]

0 2 . 5 **Describe how the BMR of a 30-year-old man will be different from the BMR of a 30-year-old woman of the same mass.**

Give a reason for your answer. [2 marks]

7

0 3 When a person exercises the concentration of carbon dioxide in the blood increases.

The change in concentration leads to a change in heart rate.

0 3 . 1 What type of receptors are activated when carbon dioxide concentration in the blood increases?

Tick (✓) ONE box. [1 mark]

☐ Baroreceptors

☐ Chemoreceptors

☐ Photoreceptors

☐ Thermoreceptors

0 3 . 2 **Approximately 500 people a week in the UK have an artificial pacemaker fitted to correct an abnormal heart rate.**

Describe how a pacemaker re-establishes the normal heart rate of a patient. [3 marks]

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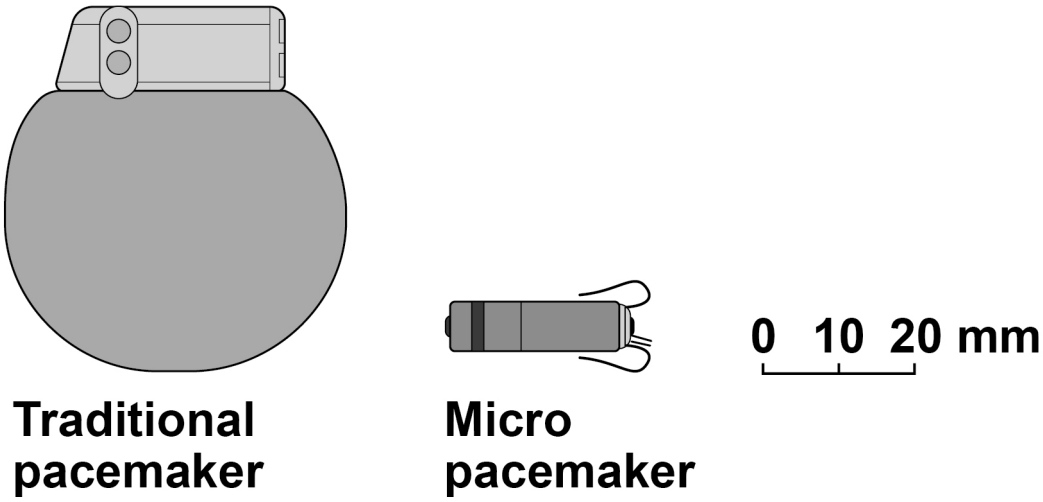
Research scientists are developing new types of pacemaker. In 2017 a new micro pacemaker was successfully implanted into a patient. FIGURE 5 shows a traditional pacemaker and a new micro pacemaker.

FIGURE 5



[Turn over]

0 3 . 3 **TABLE 1 gives some information about the two different types of pacemaker.**

TABLE 1

Traditional pacemaker	Micro pacemaker
A small cut is made under the collarbone and the electrical leads are inserted. The pacemaker box is fitted between the skin and chest muscle, and sewn in place.	Implanted through a tube inserted into an artery and guided through the artery to the heart.
Electrical leads run from the pacemaker box to the correct chambers of the heart.	No electrical leads are required.
Is removed every 6–10 years to replace the battery.	Can be permanently turned off remotely by the surgeon. Battery may last >10 years.

Suggest TWO advantages of using the smaller micro pacemaker compared with the traditional pacemaker.

Use information from TABLE 1 to help with your answer. [2 marks]

1 _____

_____

_____

2 _____

_____

_____

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END OF QUESTIONS

There are no questions printed on this page

For Examiner's Use	
Question	Mark
1	
2	
3	
TOTAL	