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<b>Level 1/Level 2 GCSE (9 - 1)</b>	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>						<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>				

# Combined Science

## Paper 1: Biology 1

Foundation Tier

Tuesday 15 May 2018 – Afternoon <b>Time: 1 hour 10 minutes</b>	Paper Reference <b>1SC0/1BF</b>
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<b>You must have:</b> Calculator, ruler	Total Marks
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### Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided  
– *there may be more space than you need.*
- Calculators may be used.
- Any diagrams may NOT be accurately drawn, unless otherwise indicated.
- You must **show all your working out** with **your answer clearly identified** at the **end of your solution**.

### Information

- The total mark for this paper is 60.
- The marks for **each** question are shown in brackets  
– *use this as a guide as to how much time to spend on each question.*
- In questions marked with an **asterisk (\*)**, marks will be awarded for your ability to structure your answer logically showing how the points that you make are related or follow on from each other where appropriate.

### Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

*Turn over* ►

**P59174A**

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Answer ALL questions. Write your answers in the spaces provided.

Some questions must be answered with a cross in a box ☒.  
If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

1 (a) Pathogens cause disease.

Draw one straight line from each type of pathogen to the disease that is caused by that pathogen.

(2)

type of pathogen	disease
<input type="checkbox"/> fungus	<input type="checkbox"/> AIDS
<input type="checkbox"/> virus	<input type="checkbox"/> malaria
	<input type="checkbox"/> tuberculosis
	<input type="checkbox"/> cholera
	<input type="checkbox"/> Chalara ash dieback

(b) Antibiotics can be used to treat diseases.

Antibiotics kill

(1)

- A antibodies
- B antigens
- C bacteria
- D viruses



(c) Figure 1 shows the number of white blood cells in blood samples from three patients.

	Patient X	Patient Y	Patient Z
Number of white blood cells per $\mu\text{l}$	8 500	5 700	12 500

**Figure 1**

Explain why the data suggests that Patient Z has a bacterial infection.

(2)

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(d) HIV is diagnosed by blood tests.

State **two** safety precautions that need to be taken when handling blood samples.

(2)

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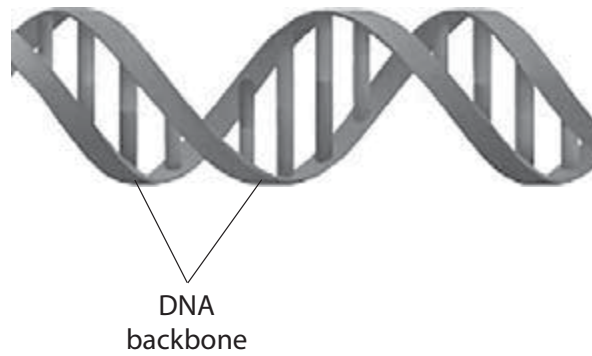
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**(Total for Question 1 = 7 marks)**



2 Figure 2 shows part of a DNA molecule.



**Figure 2**

(a) (i) What is the shape of a DNA molecule?

(1)

- A single helix
- B double helix
- C complementary helix
- D triple helix

(ii) Which molecules are present in the DNA backbone?

(1)

- A sugars and phosphates
- B amino acids and bases
- C sugars and bases
- D amino acids and phosphates

(iii) State the type of bond that joins the bases together in the DNA molecule.

(1)



(b) DNA can be extracted from fruit.

Describe how cells are broken down to release DNA.

(2)

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(c) In 2003, scientists finished sequencing the 3 billion base pairs in the human genome.

State **two** benefits that the Human Genome Project could have for medicine.

(2)

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**(Total for Question 2 = 7 marks)**



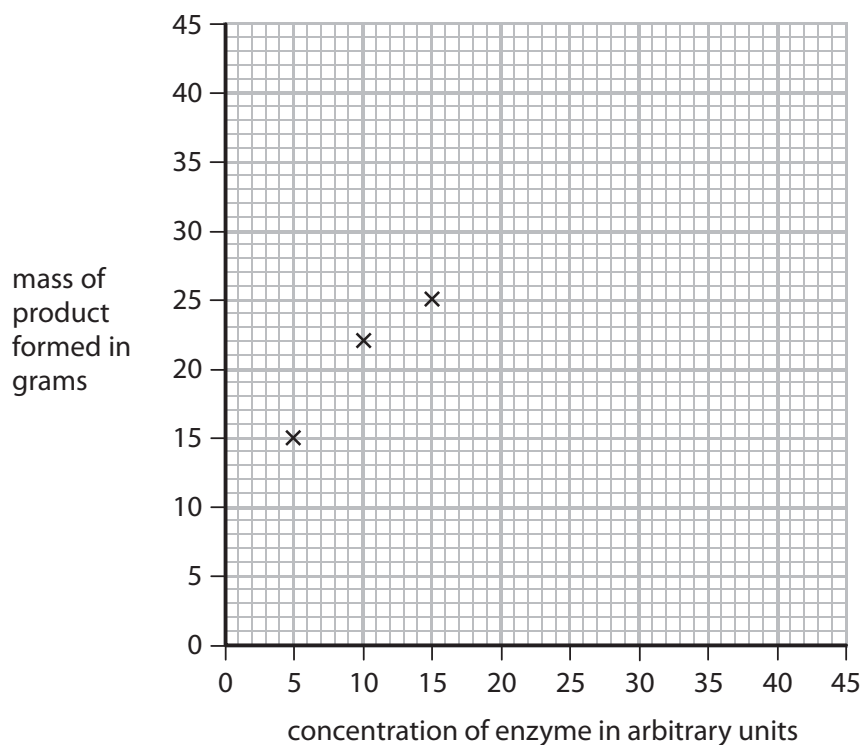
- 3 A student investigated the effect of enzyme concentration on the mass of product formed in one hour.  
Figure 3 shows the results of this investigation.

concentration of enzyme in arbitrary units	mass of product formed in grams
5	15
10	22
15	25
20	32
25	38
30	40
35	40
40	40

Figure 3

- (a) Complete the graph by plotting the points and drawing a line to show the trend in the data.  
The first three points have been plotted for you.

(2)



(b) Describe the effect that enzyme concentration has on the mass of product formed.

(2)

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(c) The ratio of enzyme concentration to the mass of product formed, using an enzyme concentration of 40 arbitrary units, is 1:1.

Calculate the ratio of enzyme concentration to product formed when the enzyme concentration is 5 arbitrary units.

(2)

ratio.....

(d) The investigation used the enzyme pepsin from the stomach, at a temperature of 37°C and at a pH of 7.

(i) Which statement gives one way to increase the mass of product formed in this investigation?

(1)

- A increase the pH
- B decrease the temperature
- C decrease the enzyme concentration
- D increase the substrate concentration

(ii) Explain why a temperature of 80°C was not used in this investigation.

(3)

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**(Total for Question 3 = 10 marks)**



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4 (a) A student cut a piece of onion and placed it on a microscope slide.

The student then placed this slide on the stage of a light microscope and looked through the eyepiece.

No cells could be seen in the piece of onion.

Explain **two** ways this method could be improved to see details of the onion cells.

(4)

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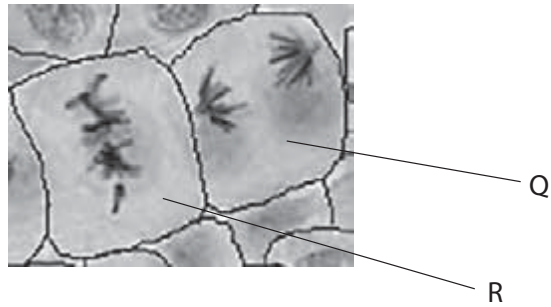
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(b) Figure 4 shows mitosis occurring in some plant cells.



**Figure 4**

(i) The cells in Figure 4 were taken from a rapidly growing part of a plant.  
Which part of a plant has rapidly dividing cells?

(1)

- A chloroplast
- B epithelium
- C meristem
- D vacuole

(ii) Which stage of mitosis is shown in cell R?

(1)

- A prophase
- B metaphase
- C anaphase
- D telophase

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(iii) Describe **two** genetic similarities of the new cells that would be produced by cell Q in Figure 4.

(2)

1

2

(iv) The cells in Figure 4 were heated in hydrochloric acid.

State **two** safety precautions that should be taken when heating hydrochloric acid.

(2)

1

2

(c) Explain **one** advantage of using an electron microscope to observe plant cells.

(2)

(Total for Question 4 = 12 marks)



5 (a) Cirrhosis is a disease caused by prolonged alcohol abuse.

(i) Prolonged alcohol abuse causes cirrhosis of the

(1)

- A brain
- B liver
- C heart
- D skin

(ii) Give **one** reason why cirrhosis is described as a non-communicable disease.

(1)

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(b) Obesity increases the risk of a person developing cardiovascular disease.

Losing weight can reduce the risk of this disease occurring.

Explain why exercise can cause weight loss.

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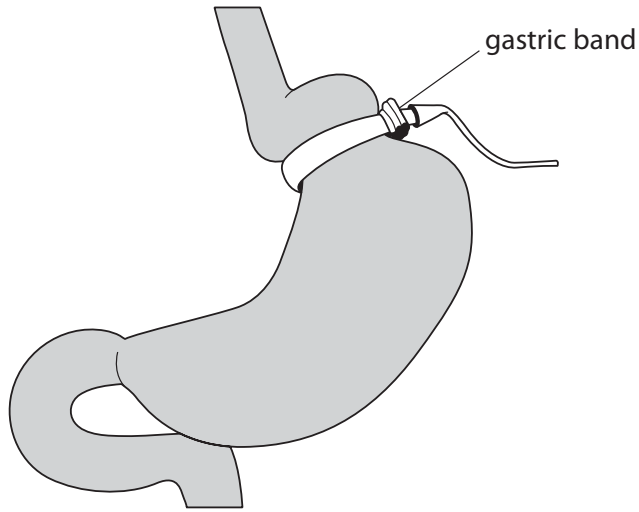
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(c) Figure 5 shows a gastric band fitted to a stomach.



**Figure 5**

Explain how a gastric band helps a person to lose weight.

(2)

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(d) BMI and waist:hip ratio can be used to find out if a person is obese.

Figure 6 shows some data for two males.

male	BMI	waist:hip ratio
A	27.3	0.85
B	?	0.81

**Figure 6**

BMI is calculated using the equation:

$$\text{BMI} = \frac{\text{mass in kilograms}}{(\text{height in metres})^2}$$

(i) Male B has a mass of 72 kg and a height of 1.81 m.

Calculate the BMI of male B.

Give the answer to 3 significant figures.

(3)

BMI = .....

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(ii) Figure 7 shows the interpretation of BMI values.

BMI range	interpretation
below 18.5	underweight
18.5 – 24.9	normal
25.0 – 29.9	overweight
30.0 and above	obese

**Figure 7**

Males with a waist : hip ratio above 0.90 are defined as abdominally obese.

Explain what the BMI and waist : hip ratio for male A shows about his weight distribution.

(2)

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**(Total for Question 5 = 11 marks)**



6 (a) Figure 8 shows two potato chips.

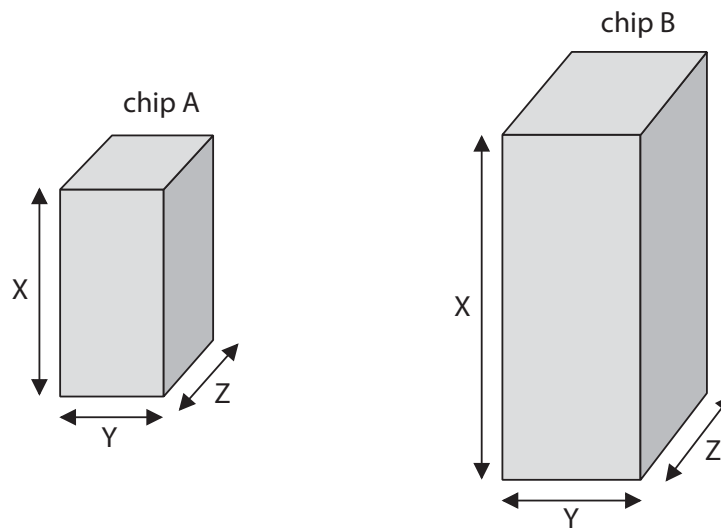


Figure 8

Figure 9 shows some information about each potato chip.

potato chip	length of X in cm	length of Y in cm	length of Z in cm	total surface area of four sides in cm <sup>2</sup>	total surface area of top and bottom in cm <sup>2</sup>	total surface area of chip in cm <sup>2</sup>
A	3.0	1.5	1.5	18.0	4.5	22.5
B	5.0	2.0	2.0	?	?	?

Figure 9

(i) Calculate the total surface area of potato chip B using the formula,

$$\text{Total surface area} = 2XY + 2XZ + 2YZ$$

(2)

total surface area = ..... cm<sup>2</sup>

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(ii) The potato chips were placed in distilled water for 20 minutes.

Figure 10 shows the increase in mass of each potato chip.

potato chip	increase in mass in grams
A	0.1
B	0.3

**Figure 10**

Explain why potato chip B has a greater increase in mass than potato chip A.

(2)

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(iii) Potato chip A is transferred from the distilled water into a concentrated salt solution.

Explain what will happen to the cells in potato chip A.

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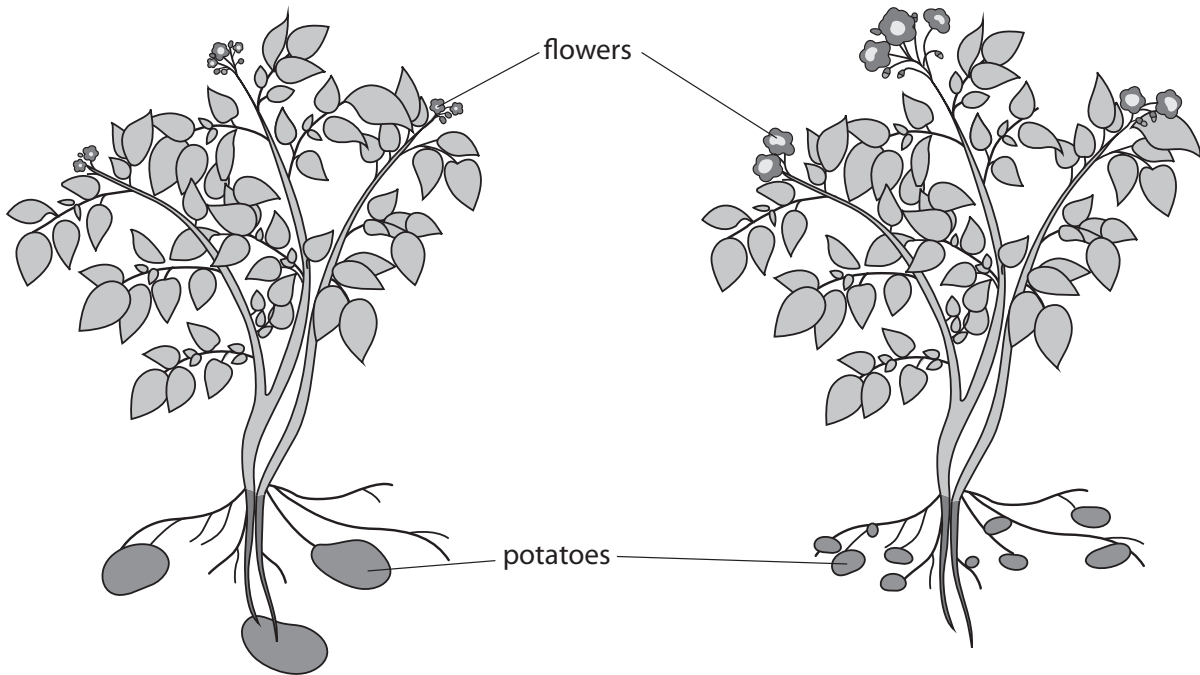
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\*(b) Figure 11 shows two varieties of potato plant.



Variety A

- large potatoes
- few potatoes
- slow growing plant

Variety B

- small potatoes
- many potatoes
- fast growing plant

Figure 11

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New varieties of potato plant can be produced by selective breeding.

Explain how selective breeding of the two varieties of potato plants can produce new potato plants that are all faster growing and produce many, large potatoes.

(6)

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**(Total for Question 6 = 13 marks)**

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**TOTAL FOR PAPER = 60 MARKS**

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