Please check the examination details below before entering your candidate information

Candidate surname	Other names

Pearson Edexcel
Level 1/Level 2 GCSE (9–1)

Centre Number | | | | | |

Candidate Number | | | | |

Monday 1 June 2020

Afternoon (Time: 1 hour 10 minutes) | Paper Reference **1SC0/2BF**

Combined Science

Paper 4

Foundation Tier

You must have:
Calculator, ruler

Total Marks

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 ▶

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Pearson

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 Figure 1 shows a diagram of the heart.

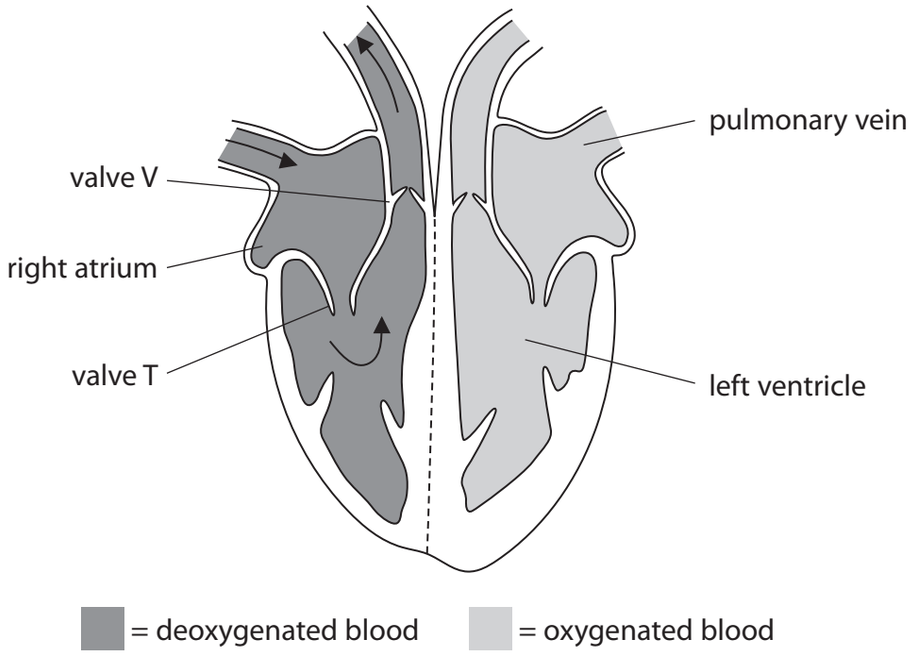


Figure 1

(a) (i) Draw arrows on Figure 1 to show how oxygenated blood moves through the heart.
(1)

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(ii) What happens when the right ventricle contracts?

(1)

- ☒ **A** valve T opens
- ☒ **B** valve T closes
- ☒ **C** blood is forced into the left atrium
- ☒ **D** blood is forced into the pulmonary vein

(iii) Draw **one** straight line from each structure to its function.

(2)

structure	**function**
pulmonary vein	carries deoxygenated blood
	forces blood towards body organs
	carries blood from the lungs to the heart
left ventricle	takes blood to the right side of the heart
	forces blood towards the lungs

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(b) Figure 2 shows a dissected vein.

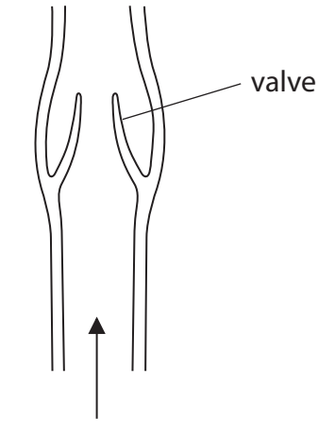


Figure 2

(i) Explain how the valves in veins help the blood, at low pressure, flow towards the heart.

(2)

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(ii) The equipment used to dissect the vein was cleaned and put into disinfectant.

State why this equipment was put into disinfectant.

(1)

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(Total for Question 1 = 7 marks)

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2 The animal shown in Figure 3 is a tick burrowing into the skin of a human.



© IanRedding/Shutterstock

Figure 3

(a) Use words from the box to complete the sentences.

(2)

enzymes	food	herbivores
parasites	producers	prey

(i) The tick burrows into the skin to obtain ..... .

(ii) When a tick burrows into human skin the tick benefits but the human is harmed.

This means that ticks are classed as ..... .

(b) When skin is cut a blood clot forms.

Which part of the blood starts the clotting process?

(1)

☒ **A** red blood cells

☒ **B** water

☒ **C** platelets

☒ **D** white blood cells

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(c) Figure 4 shows a bird called an oxpecker eating ticks that are living on a zebra.



© MartinMaritz/Shutterstock

Figure 4

(i) Name the type of relationship where both the oxpecker and the zebra benefit.

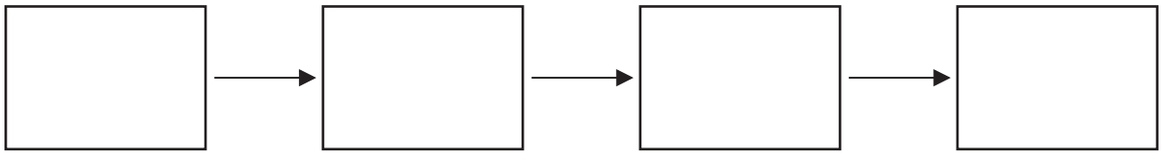
(1)

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(ii) Zebras eat grass.

Complete the food chain that includes zebras, ticks, oxpeckers and grass.

(2)



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(d) Figure 5 shows the maximum numbers of oxpeckers observed on four types of mammal.

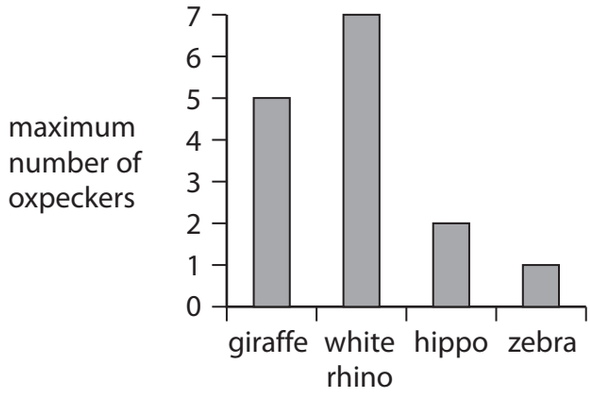


Figure 5

(i) Describe the difference in the maximum number of oxpeckers on the white rhino and on the hippo.

(2)

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(ii) Give **one** reason why more oxpeckers were observed on giraffes than on zebras.

(1)

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(Total for Question 2 = 9 marks)

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3 A scientist investigated the distribution of invertebrates found in a garden.

(a) Figure 6 shows an invertebrate about to fall into a pitfall trap.

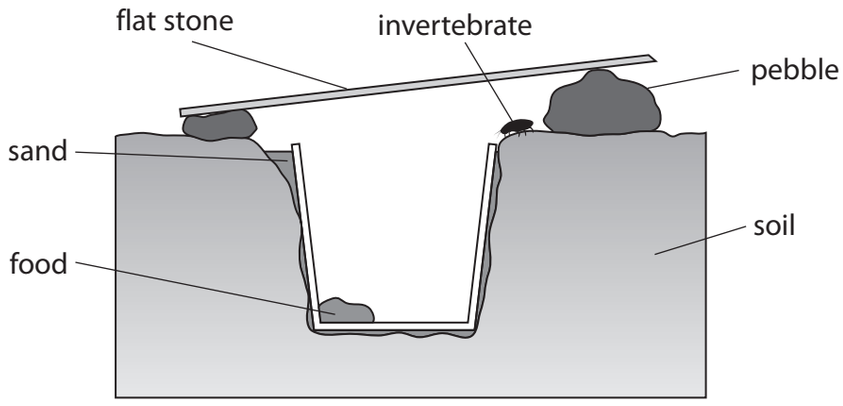


Figure 6

The steps the scientist used to set up the pitfall trap are shown below.

The steps are not in the correct order.

1. put some sand around the beaker
2. put a beaker, baited with food, in the hole
3. place a flat stone on pebbles over the beaker
4. check the pitfall trap each day
5. dig a hole in the garden

Complete the steps in the correct order, from left to right.

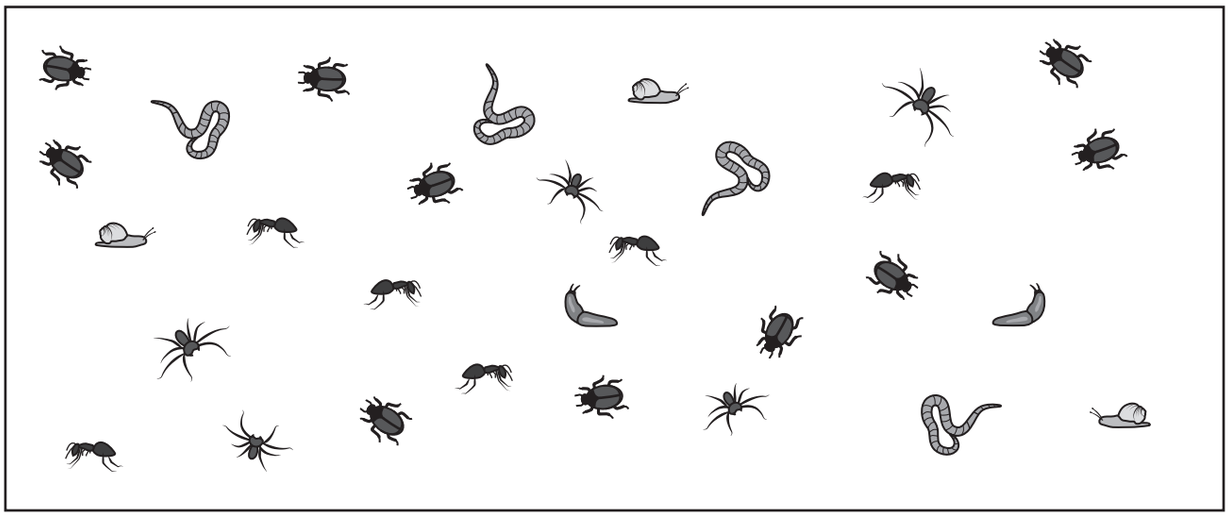
The first number has been written in for you.

(2)

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(b) Figure 7 shows 30 invertebrates that the scientist collected.



key					
					
beetle	snail	ant	spider	slug	worm

Figure 7

(i) Complete the table by filling in the tally and number for the spiders and worms.

(2)

invertebrate	tally	number of invertebrates
ant	𝍸 |	6
beetle	𝍸 𝍸	10
slug	||	2
snail	|||	3
spider		
worm		

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(ii) The scientist selected an invertebrate at random to observe it in more detail.

State the probability that the invertebrate selected is an ant.

Give your answer in its simplest form.

(2)

(iii) State how the type of food used to bait the pitfall trap could affect the number of different invertebrates caught.

(1)

(c) The scientist also counted the number of snails in four $1 m^2$ areas of the garden.

The garden had a total area of $40 m^2$.

Describe how the scientist can use this information to estimate the number of snails in the garden.

(2)

(Total for Question 3 = 9 marks)

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4 (a) (i) Which row of the table shows the endocrine gland and hormone involved in the control of blood glucose concentration?

(1)

	endocrine gland	hormone
☒ **A**	ovary	oestrogen
☒ **B**	ovary	insulin
☒ **C**	pancreas	oestrogen
☒ **D**	pancreas	insulin

(ii) State a target organ for the hormone that controls blood glucose concentration.

(1)

.....

(b) People with a high BMI are more likely to develop type 2 diabetes.
Figure 8 shows the mass, height and BMI for two people.

person	mass in kilograms	height in metres	BMI
A	110	2.0	?
B	85	1.5	38

Figure 8

(i) Use the formula to calculate the BMI for person A

$$\text{BMI} = \frac{\text{mass}}{\text{height}^2}$$

(2)

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(ii) Person B develops type 2 diabetes.

Describe **two** lifestyle changes person B should make to help to control their blood glucose concentration.

(2)

1 .....

.....

2 .....

.....

(c) (i) Which row of the table shows the type or types of respiration that use glucose?

(1)

		aerobic respiration	anaerobic respiration
☒	**A**	yes	yes
☒	**B**	yes	no
☒	**C**	no	yes
☒	**D**	no	no

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(ii) A scientist measured the rate of respiration in a person when sleeping and then running at different speeds.

Figure 9 shows the results.

activity	speed in km per hour	respiration rate in kJ per minute
sleeping	0	3
running slowly	8	90
running quickly	12	130

Figure 9

Explain the trend shown in Figure 9.

(3)

(Total for Question 4 = 10 marks)

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5 Figure 10 shows the leaves and flowers of water lily plants (*Nymphaea odorata*) on a lake.



© Oleksandr Shymanskyi/123RF

Figure 10

(a) Water lilies have stomata on the upper surface of the leaves.

Explain why water lilies have no stomata on the lower surface of the leaves.

(2)

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(b) (i) The white petals of the water lily flowers cannot photosynthesise.

Which structure in leaf cells is the site of photosynthesis?

(1)

☒ **A** nucleus

☒ **B** vacuole

☒ **C** mitochondrion

☒ **D** chloroplast

(ii) Glucose is made by photosynthesis.

Glucose is converted to another sugar to be transported in the plant.

What is the name of this sugar?

(1)

☒ **A** glycerol

☒ **B** ribose

☒ **C** sucrose

☒ **D** starch

(iii) Describe how this sugar is transported from the leaves to the flowers of the water lily.

(2)

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(c) Figure 11 shows water lilies growing in a lake in Europe.



© lynn gladwell/123RF

Figure 11

(i) One water lily plant was brought from America 10 years ago and planted in the lake shown in Figure 11.

Explain why this non-indigenous plant now covers the whole surface of the lake.

(3)

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(ii) Explain how the water lilies will affect the biodiversity of this lake.

(3)

(Total for Question 5 = 12 marks)

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6 A slide of potato cells was viewed using a light microscope.

Figure 12 is a drawing of the slide showing starch grains in the potato cells.

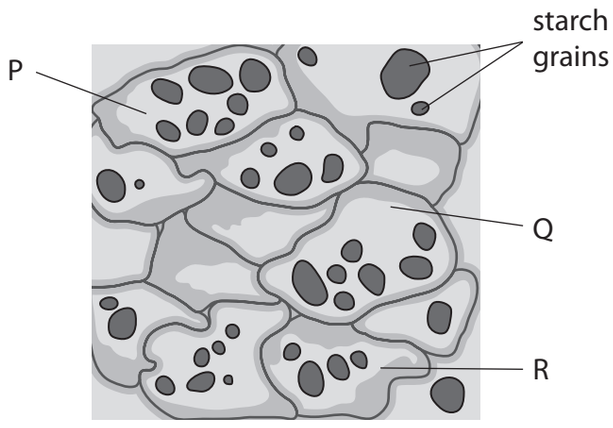


Figure 12

(a) (i) Calculate the mean number of starch grains in potato cells P, Q and R.

(1)

..... starch grains

(ii) Which structures are found in plant cells but are **not** found in animal cells?

(1)

☒ **A** cell membrane, nucleus, chloroplast

☒ **B** cell wall, cell membrane, cytoplasm

☒ **C** nucleus, large vacuole, chloroplast

☒ **D** cell wall, chloroplast, large vacuole

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(b) A scientist investigated how the length of starch grains in potatoes changed when the potatoes were stored in the dark.

Figure 13 shows a potato after being stored in the dark.



© rodimov/Shutterstock

Figure 13

Three potatoes were used in the investigation.

The length of starch grains in potato 1 were measured at the start.

The length of starch grains were measured in potato 2 after 5 weeks in the dark.

The length of starch grains were measured in potato 3 after 10 weeks in the dark.

Figure 14 shows the results.

potato	time after placing in the dark in weeks	mean length of starch grains in μm
1	0	64
2	5	50
3	10	30

Figure 14

(i) Calculate the percentage difference in the mean length of starch grains in potato 2 at 5 weeks and in potato 3 at 10 weeks.

(2)

.....%

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(ii) State **two** variables the scientist should have controlled to improve this investigation.

(2)

1 .....

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2 .....

.....

(iii) The starch grains in the potatoes became smaller as the starch was converted into glucose.

State why the potatoes need glucose.

(1)

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*(c) Figure 15 shows a diagram of some equipment that can be used to investigate the rate of photosynthesis.

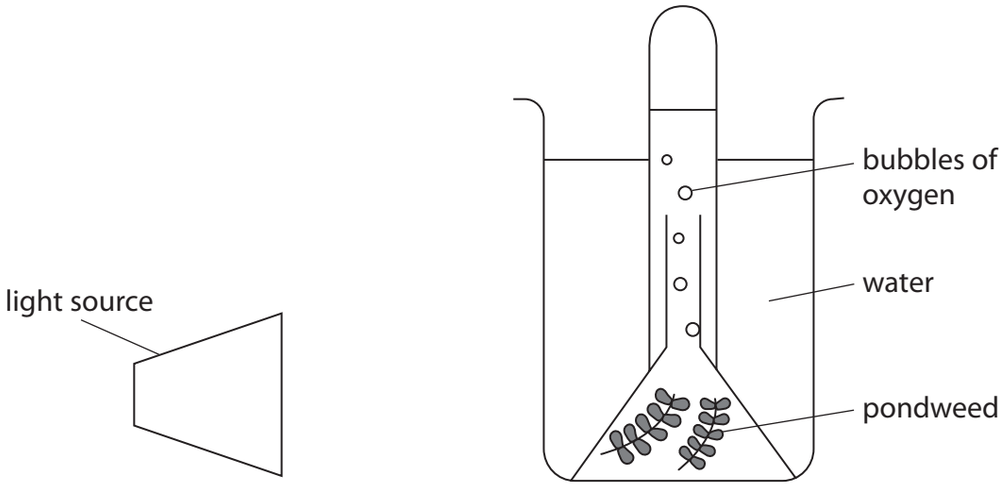


Figure 15

Devise a plan to investigate the effect of light intensity on the rate of photosynthesis.

Include variables you would need to control.

(6)

(Total for Question 6 = 13 marks)

TOTAL FOR PAPER = 60 MARKS

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