Write your name here

Surname	Other names

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

Centre Number | | | | | |

Candidate Number | | | | |

Combined Science

Paper 2: Biology 2

Higher Tier

Monday 11 June 2018 – Morning
Time: 1 hour 10 minutes

Paper Reference
1SC0/2BH

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 (a) Figure 1 shows a diagram of a red blood cell from a turtle and a diagram of a red blood cell from a human.

turtle human

Figure 1

(i) These cells are animal cells.

Animal cells do not have

(1)

☒ **A** cytoplasm

☒ **B** a cell membrane

☒ **C** a cell wall

☒ **D** mitochondria

(ii) The actual length of the red blood cell from a turtle is 20.5 μm.

Calculate the length of the magnified image of the red blood cell of the turtle when magnified 400×.

(2)

.....μm

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(iii) The width of the human red blood cell, when magnified 400×, is 3.08 mm.

Calculate the actual width of the cell and show your answer in standard form.

(2)

.....mm

(b) Red blood cells are carried in veins and arteries.

Figure 2 shows the equipment used to measure the elasticity of an artery.

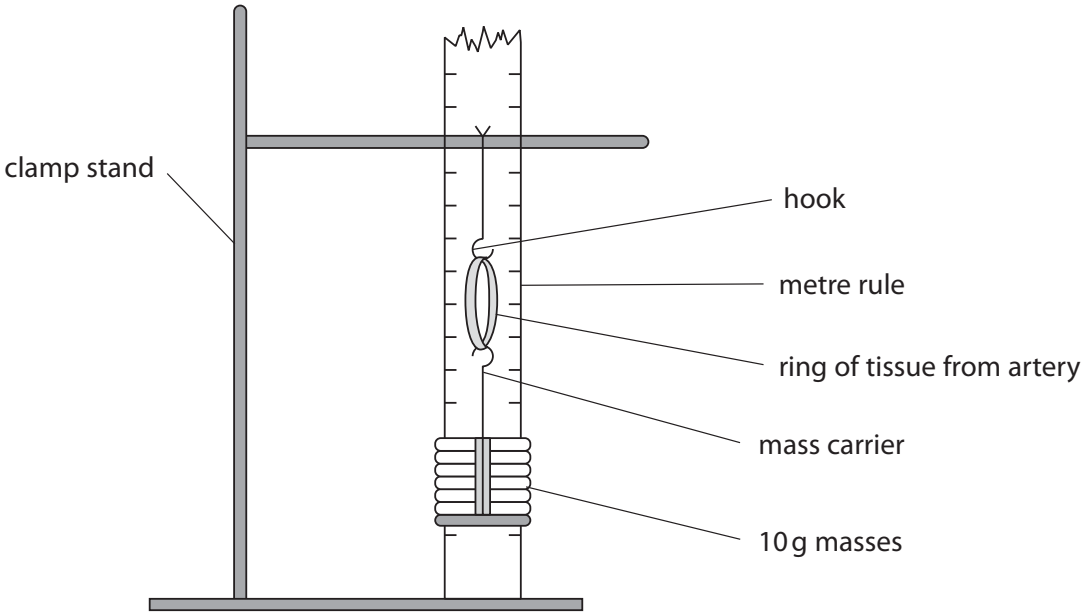

Figure 2

(i) Describe a method you could use to see how much the ring of tissue from an artery could stretch before it no longer returned to its original size.

(3)

.....

.....

.....

.....

.....

.....

(ii) Give **one** safety precaution you need to take when handling animal tissue such as blood vessels.

(1)

.....

.....

(Total for Question 1 = 9 marks)

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2 A student compared the number of stomata on the upper and lower surfaces of a leaf.

She completed a leaf peel as shown in Figure 3.

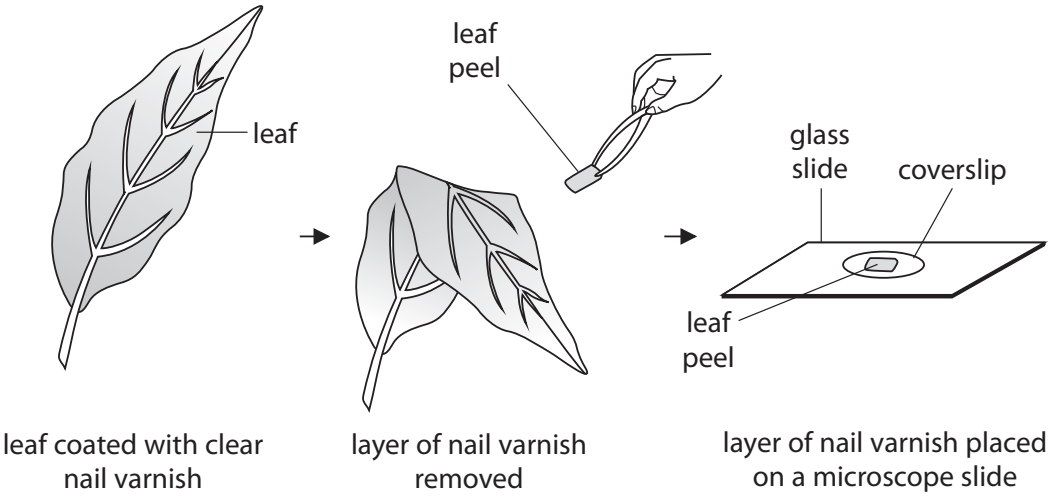

Figure 3

The layer of nail varnish shows an impression of the cells on the surface of the leaf.

(a) (i) State why a coverslip is placed on top of the leaf peel.

(1)

.....

(ii) Explain why the leaf peel rather than the whole leaf was viewed with a microscope.

(2)

.....

.....

.....

.....

(b) The student drew a biological diagram of the leaf peel taken from the underside of the leaf.

Figure 4 shows this diagram.

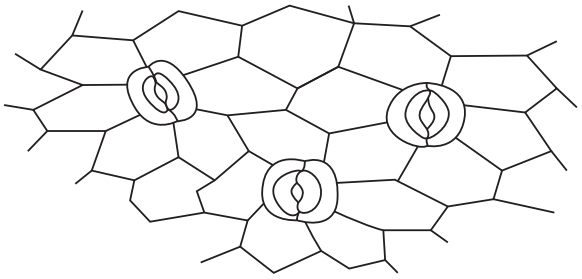

Figure 4

(i) State the number of stomata visible on Figure 4.

(1)

.....

(ii) The student observed that the stomata were open.

Describe how stomata open.

(3)

.....

.....

.....

.....

.....

.....

(iii) The leaf peel from the upper surface of this leaf showed no stomata.

Explain why it is an advantage to the plant to have this distribution of stomata in the upper and lower surfaces of the leaf.

(2)

.....

.....

.....

.....

(Total for Question 2 = 9 marks)

3 Figure 5 shows the estimated blood flow through some parts of the body when a person is at rest and during exercise.

part of the body	estimated rate of blood flow in cm^3 per minute	
	at rest	during exercise
brain	750	748
heart muscle	350	1 150
digestive system	2 500	1 200
other muscles	1 200	14 500
all other organs (except lungs)	1 423	1 420

Figure 5

(a) Compare the rate of blood flow through the body when this person is at rest and during exercise.

(3)

(b) Explain why there is a change in the rate of blood flow through the digestive system during exercise.

(2)

(c) The stroke volume is the amount of blood leaving one chamber of the heart per beat.

From which chamber of the heart does this volume of oxygenated blood flow?

(1)

☒ **A** left atrium

☒ **B** left ventricle

☒ **C** right atrium

☒ **D** right ventricle

(d) A person has a cardiac output of 4.9 litres per minute. The stroke volume of each heart beat is 70 ml.

Calculate the heart rate.

(2)

..... beats per minute

(Total for Question 3 = 8 marks)

4 (a) A student investigated the effect of nitrate ion concentration on plant growth. She placed barley seedlings in three test tubes containing different concentrations of nitrate fertiliser.

Test tube 1 contained distilled water with 1 pellet of nitrate fertiliser.
Test tube 2 contained distilled water with 2 pellets of nitrate fertiliser.
Test tube 3 contained distilled water with 3 pellets of nitrate fertiliser.

After 7 days, the lengths of the seedlings were measured.

Figure 6 shows an example of the apparatus used.

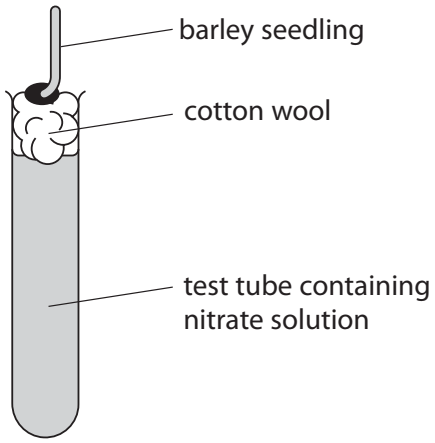

Figure 6

(i) Describe a control for this investigation.

(2)

(ii) The nitrate fertiliser contains the chemical compound potassium nitrate. The hazard symbol on the bag of potassium nitrate fertiliser is shown in Figure 7.

Figure 7

Which hazard does this symbol represent?

(1)

☒ **A** flammable

☒ **B** oxidising

☒ **C** corrosive

☒ **D** explosive

(iii) Give a method, other than measuring the change in length, that would show the growth of the seedlings.

(1)

.....

.....

(b) Figure 8 shows the results of this investigation.

seedling in test tube	length at the start in mm	length after 7 days in mm
1	4	11
2	6	17
3	5	26

Figure 8

(i) Explain why there are differences in the change in the lengths of the seedlings.

(2)

(ii) Explain how nitrate ions were absorbed by the seedling in test tube 3.

(3)

(c) Farmers use crop rotation to reduce the need to add nitrate fertilisers to the soil.

Plants such as peas and beans have a mutualistic relationship with nitrogen-fixing bacteria.

Explain why farmers use these plants in their crop rotation cycle.

(3)

(Total for Question 4 = 12 marks)

5 (a) Figure 9 shows the effect of light intensity and temperature on the rate of photosynthesis.

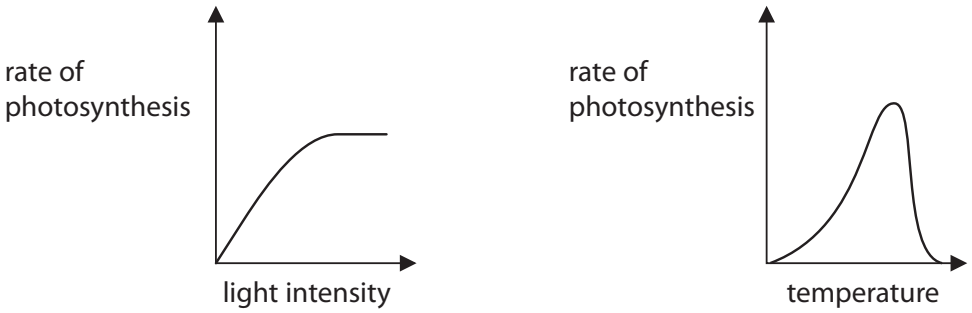

Figure 9

(i) Describe the effect of light intensity on the rate of photosynthesis.

(2)

(ii) Explain the effect of temperature on the rate of photosynthesis.

(2)

(b) A student measured the rate of photosynthesis using algal balls in a laboratory. The tube of algal balls was kept at a temperature of 25 °C and was moved to different distances from a light source.

The results of this investigation showed that the rate of photosynthesis is

(1)

☒ **A** directly proportional to the distance from a light source

☒ **B** inversely proportional to light intensity

☒ **C** directly proportional to temperature

☒ **D** inversely proportional to the distance from a light source

*(c) Explain how substances are moved through a plant by transpiration and translocation.

(6)

(Total for Question 5 = 11 marks)

6 (a) Figure 10 shows the concentration of the hormones oestrogen and progesterone in the blood of women of different ages.

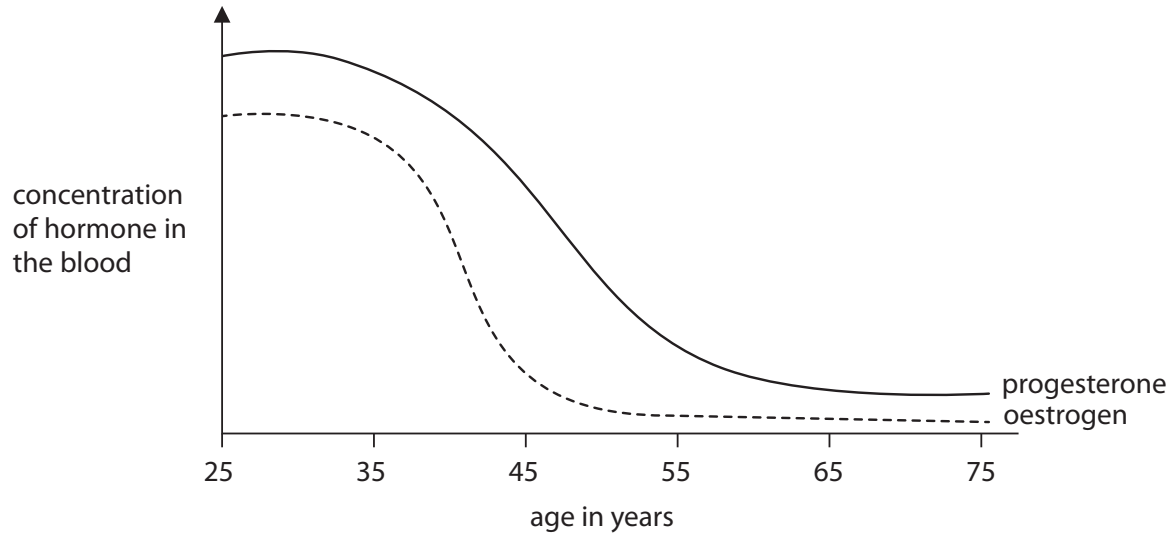

Figure 10

(i) Use information from Figure 10 to explain why women over the age of 50 are less likely to ovulate.

(2)

(ii) Use information from Figure 10 to explain why women are less likely to menstruate after the age of 60.

(2)

(iii) Explain how clomifene therapy may increase the chance of a woman over the age of 50 becoming pregnant.

(2)

(iv) The hormone progesterone is produced by the

(1)

☒ **A** corpus luteum

☒ **B** pituitary

☒ **C** thyroid

☒ **D** uterus

(b) Explain how the release of adrenalin can result in the improved performance of an athlete.

(4)

(Total for Question 6 = 11 marks)

TOTAL FOR PAPER = 60 MARKS

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