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 | | | | |

**Mock Set 2 – Autumn 2018**

(Time: 1 hour 45 minutes) | Paper Reference **1BI0/2H**

# Biology

## Paper 2

**Higher 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 100.
- 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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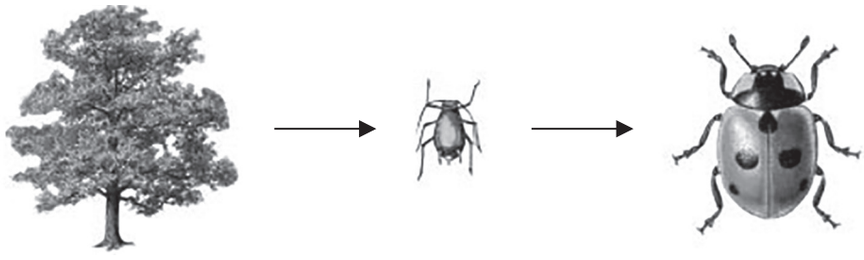
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Pearson

**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 the biomass of organisms in a food chain.



| organism | biomass / g |
|---|---|
| oak tree | 22 000 |
| aphids | 2 000 |
| ladybirds | 250 |

**Figure 1**

(i) Draw and label a pyramid of biomass for Figure 1.

**(2)**

(ii) The percentage of biomass transferred from the aphids to the ladybirds for growth is 9%.

Calculate the biomass transferred from the aphids to the ladybirds.

**(2)**

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(iii) Give **one** reason why only 9% of the biomass of the aphids is used for the growth of the ladybirds.

**(1)**

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(b) Aphids also feed on rose bushes.

Explain why a rose grower would release ladybirds into glasshouses containing rose bushes.

**(2)**

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

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**2** The effect of temperature on photosynthesis was investigated using the apparatus shown in Figure 2.

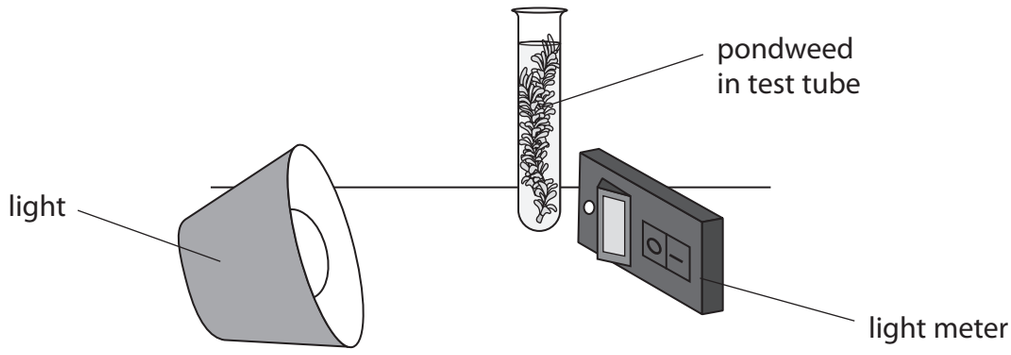



**Figure 2**

(a) Complete the equation for photosynthesis.

**(1)**

carbon dioxide + water $\xrightarrow[\text{chlorophyll}]{\text{light}}$ ..... + .....

(b) The pondweed was placed in a test tube of water at 10 °C.

The number of bubbles of gas produced by the pondweed in three minutes was recorded.

This was repeated with water at different temperatures.

The light intensity was kept constant for each temperature.

(i) State why the light intensity absorbed by the pondweed is not the same as the light intensity measured by the light meter.

**(1)**

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(ii) Give **two** ways of improving this investigation.

**(2)**

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(c) (i) Figure 3 shows a cross-section of the stem of the pondweed, as seen using a light microscope.

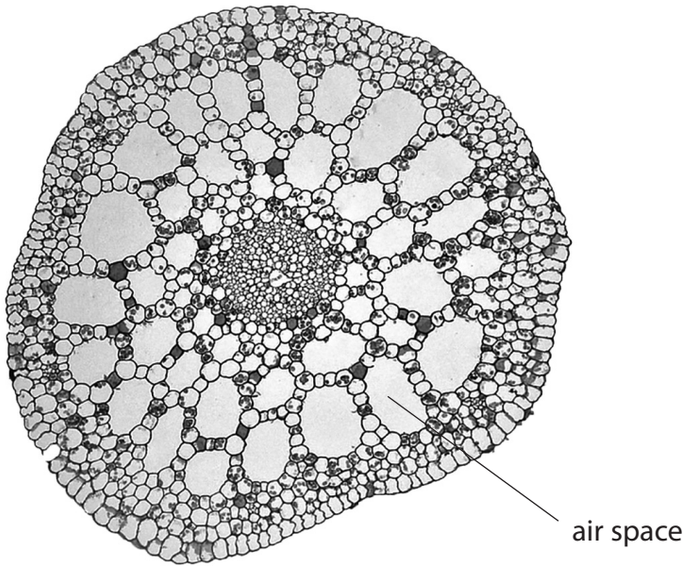



**Figure 3**

The length of the air space labelled on Figure 3 is 12 mm.

The actual length of this air space is 0.05 mm.

Calculate the magnification of Figure 3.

**(2)**

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(ii) Describe how to prepare a slide of a cross-section of a stem, as shown in Figure 3.

**(3)**

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**(Total for Question 2 = 9 marks)**

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**3** (a) Figure 4 shows the concentration of the hormones oestrogen and progesterone and the thickness of the uterus lining.

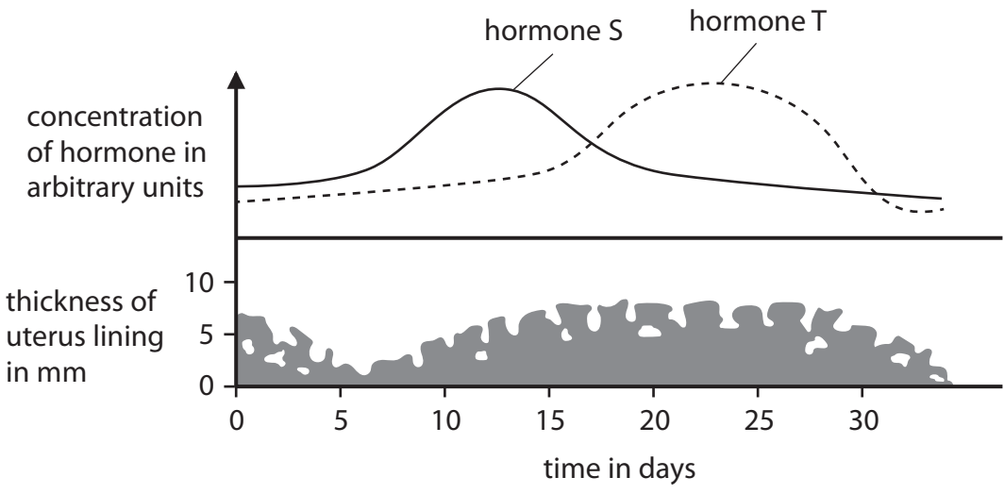



**Figure 4**

(i) Which row shows the name of hormone S and the endocrine gland that makes hormone S?

**(1)**

| | | hormone S | endocrine gland |
|---|---|---|---|
| ☒ | **A** | oestrogen | uterus |
| ☒ | **B** | progesterone | ovary |
| ☒ | **C** | oestrogen | ovary |
| ☒ | **D** | progesterone | uterus |

(ii) State which day an egg cell is most likely to be released from the ovary.

**(1)**

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(b) Figure 5 shows the success rates for some methods of contraception.

| methods of contraception | how the contraceptive is used | percentage success rate (%) | |
|---|---|---|---|
| | | perfect use | typical use |
| hormone implant | inserted under the skin and slowly releases hormones | 99.5 | 99.5 |
| diaphragm | covers the cervix during sexual intercourse | 99.0 | 92.0 |
| vaginal ring | fitted inside the vagina and releases hormones | 94.0 | 84.0 |
| vasectomy | tubes leading from the testes are cut and sealed | 99.9 | 99.9 |
| condom | covers the penis during sexual intercourse | 98.0 | 85.0 |

**Figure 5**

(i) Explain why a vasectomy could be described as a barrier method of contraception.

**(2)**

(ii) Comment on the percentage success rate for perfect use and typical use for the methods of contraception shown in Figure 5.

**(3)**

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(c) The hormone FSH is used in clomifene therapy to help infertile women to conceive.

Explain why FSH is used in clomifene therapy.

**(2)**

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**(Total for Question 3 = 9 marks)**

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**4** Figure 6 shows the urinary system of a human.

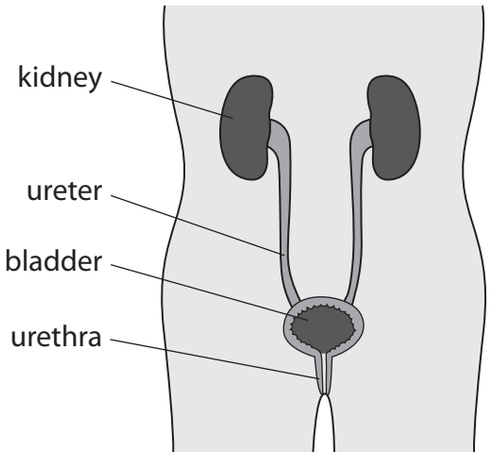



**Figure 6**

(a) State the function of the bladder.

**(1)**

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(b) Some water moves back into the blood from each nephron in the kidney.

Explain how water moves back into the blood.

**(2)**

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(c) A scientist took a layer of cells from a kidney tubule.

The layer of cells was used to separate two sides of a beaker, as shown in Figure 7.

This apparatus was used to investigate the effect of concentration on the diffusion rate of urea.

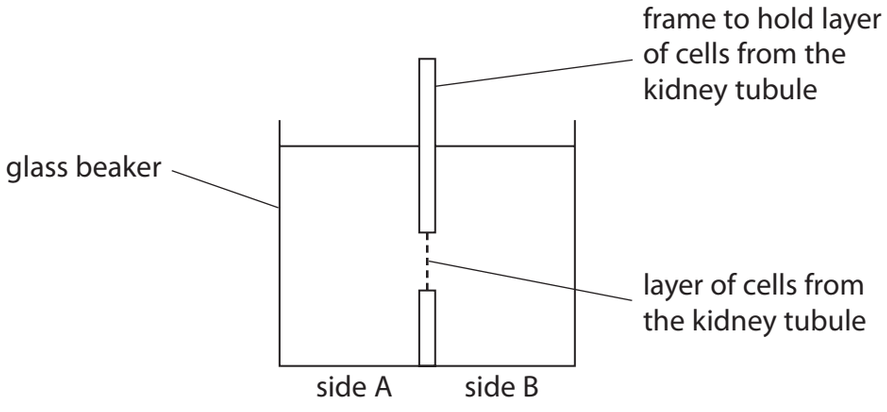



**Figure 7**

Side A contains 50 $cm^3$ of urea solution at a concentration of 250 mmol per $cm^3$.

Side B contains 50 $cm^3$ of distilled water.

Explain how the concentration of urea in side A will change.

**(3)**

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(d) Glucose is reabsorbed from the nephron.

Figure 8 shows the rate of reabsorption for different concentrations of glucose.

| concentration of glucose in mmol $dm^{-3}$ | rate of reabsorption in arbitrary units |
|---|---|
| 1 | 75 |
| 2 | 150 |
| 4 | 300 |
| 6 | 300 |

**Figure 8**

Describe the conclusions that can be drawn from this data.

**(2)**

(e) A 25 year old man with kidney disease could be treated using kidney dialysis or by having a kidney transplant.

Give **three** disadvantages of using kidney transplants to treat kidney disease.

**(3)**

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**(Total for Question 4 = 11 marks)**

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**5** (a) A student investigated the distribution of daisy plants in a field.
Tall trees are growing along one side of the field.
The student investigated the effect these tall trees had on the number of daisy plants growing in the field.

(i) Devise a plan to measure the effect these tall trees had on the number of daisy plants growing in the field.

**(3)**

(ii) Name this method of sampling.

**(1)**

(iii) Describe how **two** abiotic factors could be measured in this investigation.

**(2)**

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(b) The student collected data on the distribution of the daisy plants.

This data is shown in Figure 9.

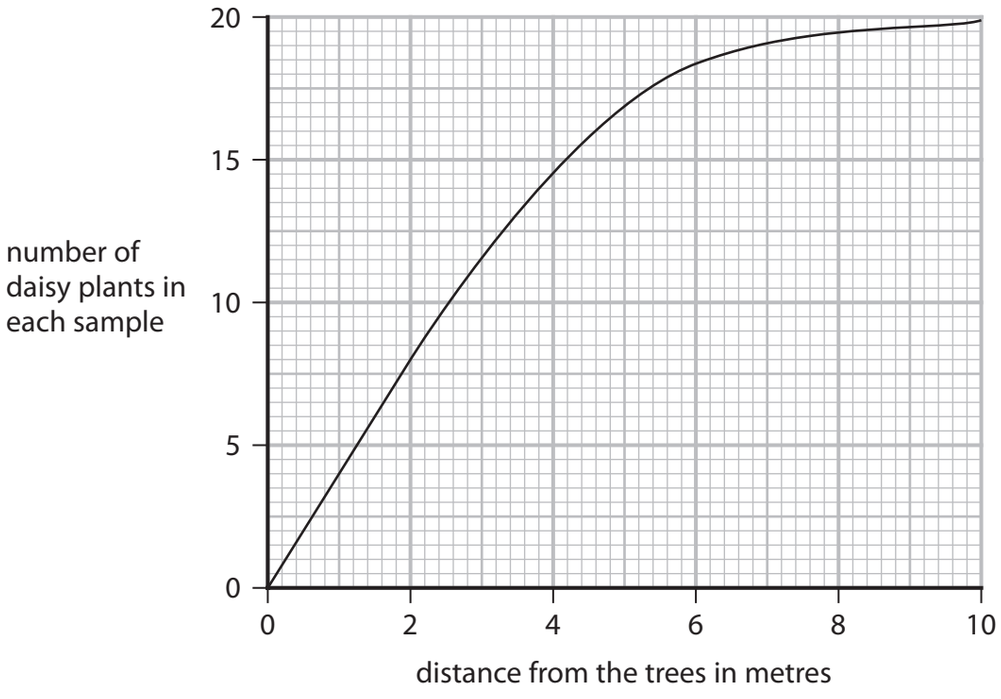



**Figure 9**

(i) Describe the trend shown in this graph.

**(2)**

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(ii) Explain why the trees affect the distribution of the daisy plants.

**(2)**

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**(Total for Question 5 = 10 marks)**

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**6** (a) Figure 10 shows a blood smear.

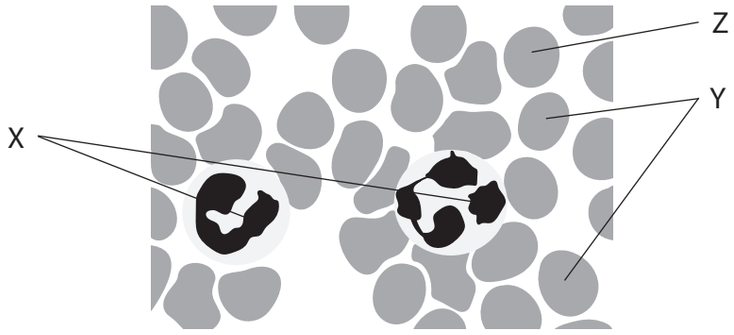



**Figure 10**

(i) Which row of the table names blood cell X and blood cell Y?

**(1)**

| | | blood cell X | blood cell Y |
|---|---|---|---|
| ☒ | **A** | phagocyte | platelet |
| ☒ | **B** | erythrocyte | phagocyte |
| ☒ | **C** | erythrocyte | platelet |
| ☒ | **D** | phagocyte | erythrocyte |

(ii) What is the function of the cells labelled X?

**(1)**

☒ **A** engulf pathogens

☒ **B** transport oxygen

☒ **C** transport carbon dioxide

☒ **D** produce antigens

(iii) The image of the cell labelled Z has a diameter of 8 mm.

The magnification of the image is ×900.

Calculate the actual diameter of cell Z.

Give your answer in standard form.

**(3)**

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(b) Explain **two** ways in which the structure of capillaries are adapted for efficient gas exchange.

**(4)**

(c) State how blood carried in the pulmonary vein is different from blood carried by all other veins in the human body.

**(1)**

**(Total for Question 6 = 10 marks)**

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**7** (a) A student measured the temperature in a compost bin.

Figure 11 shows the results.

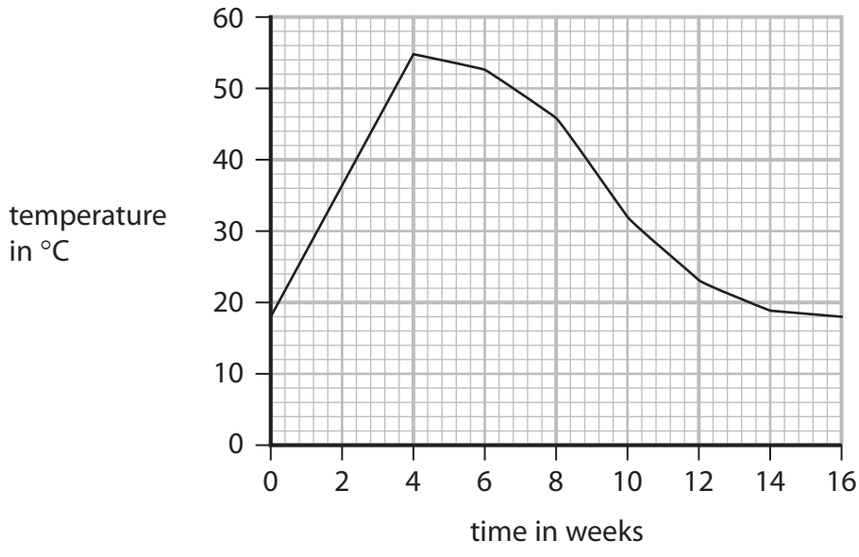



**Figure 11**

(i) Describe the trends in Figure 11.

**(2)**

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(ii) Explain why the temperature changed in the first four weeks.

**(3)**

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(iii) The compost bin contained 50 litres of waste plant material.

The plant material was completely decomposed by the end of 16 weeks.

Calculate the rate of decomposition per day for this compost.

**(2)**

..... litres per day

(b) Compost can be used as a fertiliser.

Explain why fertilisers increase the yield of crop plants.

**(3)**

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**(Total for Question 7 = 10 marks)**

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**8** A student investigated the relationship between breathing rate and exercise for two groups of people.

Group 1 were people who exercised for two hours per week.

Group 2 were people who did not exercise regularly.

Breathing rate at rest was recorded.

Breathing rate was then measured each minute during five minutes of exercise.

The mean for each group was calculated.

Figure 12 shows the results.

| exercise time in minutes | mean breathing rate in breaths per minute | |
|---|---|---|
| | group 1 | group 2 |
| at rest | 11 | 12 |
| 1 | 15 | 17 |
| 2 | 18 | 24 |
| 3 | 23 | 29 |
| 4 | 26 | 33 |
| 5 | 28 | 37 |

**Figure 12**

(a) (i) State **two** variables, other than the amount of exercise, that should be kept the same when choosing people for this investigation.

**(2)**

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(ii) Explain why the breathing rate changed for both groups when they exercised.

**(3)**

(b) The investigation was extended for the people in group 1.

These people continued to exercise for a further 40 minutes.

Explain why these people developed muscle cramp.

**(3)**

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(c) The cardiac output for a person in group 1 while exercising was 5 500 ml per minute.

Their heart rate during exercise was 111 beats per minute.

Calculate the stroke volume for this person using the equation:

$$\text{cardiac output} = \text{stroke volume} \times \text{heart rate}$$

Give the correct units in your answer.

**(3)**

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**(Total for Question 8 = 11 marks)**

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**9** (a) Three seedlings were placed in different positions and left for three days.

Seedling A was placed horizontally.

Seedling B was placed vertically with the root facing upwards.

Seedling C was placed vertically with the root facing downwards.

Figure 13 shows these seedlings after three days.

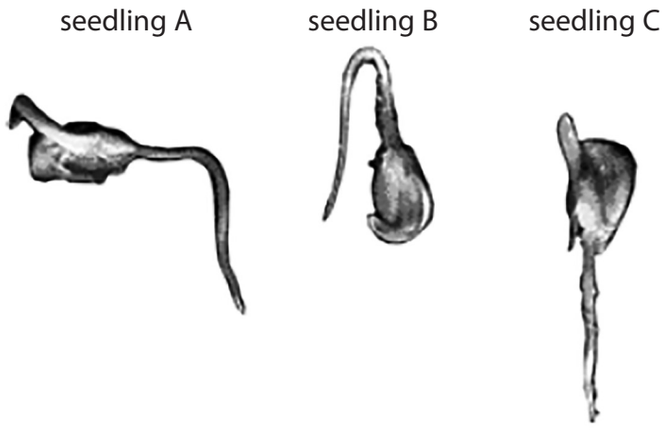



**Figure 13**

(i) Which process causes the roots to grow in this way?

**(1)**

☒ **A** germination

☒ **B** positive gravitropism

☒ **C** positive phototropism

☒ **D** pollination

(ii) Compare the root growth of seedling B with the root growth of seedling C.

**(2)**

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(iii) Explain what happened to the cells in the root of seedling A to cause the change in the direction of growth.

**(3)**

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*(b) Figure 14 shows the cross-section of the leaf of a flowering plant.

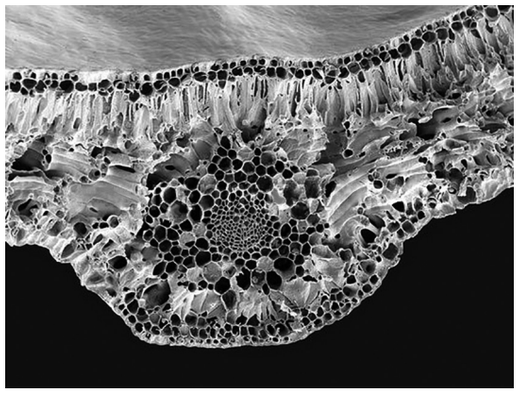


**Figure 14**

Describe the structure and function of the layers within the cross section of this leaf.

**(6)**

**(Total for Question 9 = 12 marks)**

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**10** (a) Adrenalin is produced by the adrenal glands.

Which body system includes adrenal glands?

**(1)**

☒ **A** circulatory system

☒ **B** digestive system

☒ **C** endocrine system

☒ **D** urinary system

*(b) If a person is in danger, adrenalin is released from the adrenal glands.

Explain the effect of increased adrenalin on the human body.

**(6)**

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(c) Glucagon has a similar effect to adrenalin in the liver.

Explain how glucagon affects the concentration of glucose in the blood.

**(4)**

**(Total for Question 10 = 11 marks)**

**TOTAL FOR PAPER = 100 MARKS**

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