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Examiners' Report
June 2022

GCSE Biology 1BI0 2F

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June 2022

Publications Code 1BI0_2F_2206_ER

Introduction

Paper 1BI0_2F is taken by candidates who have followed the GCSE Biology specification.

The paper consists of 100 marks assessed by a mixture of different question styles, including multiple-choice, short answer, data interpretations and calculations and two extended open response question.

All questions should be answered in the allowed time of 1 hour 45 minutes. The extended open response questions are identified by an asterisk (*) in the question paper to indicate that marks are also awarded for the ability to structure a response logically. The Biology papers assess aspects of working scientifically and mathematical skills, the requirements of which are given in the specification.

There are eight core practicals in the biology content which must be completed prior to sitting the examination. Paper 1BI0 2F_assesses content from Topic 1 and Topics 6 – 9. The 2022 paper covered areas of the specification including cells, adaptations and microscopes, xylem, transpiration, homeostasis and thermoregulation, the urinary system, blood, decomposition and food preservation, eutrophication, the carbon and water cycle and energy transfer within an ecosystem. The two extended open response questions were based on the treatment for kidney failure and relating functions to structures of the heart.

Questions assessing practical skills included preparing a microscope slide and the effect of light and temperature on photosynthesis, the effect of air movement on transpiration and the effect of light on plant growth. Mathematical skills tested included interpretation of data in graphs and tables, image magnification, rate, volume, and percentage.

This year, advance information was supplied advising the candidates of which general areas of the specification were being examined. It is thought that candidates possibly took less advantage of the advance information with paper two compared to paper one, as many had other examinations in the same week and they perhaps did not have the time to cover such points before sitting paper 2F.

There were several questions that tested the candidates' ability to apply their knowledge to different situations but in these cases, all the information needed to lead candidates to the required response was supplied in the stem of the questions. Candidates could still benefit from practising reading the stem and considering which parts are key to stimulate the connections to areas of the specification covered. It was pleasing to see some examples where candidates had underlined the command words and key words as well as writing key words by the question for extended prose responses. The more straightforward questions where marks could be gained by interpreting given information were answered well, although it was pleasing to see some excellent, coherent answers accurately applying relevant scientific terminology to all questions that required extended prose. It was encouraging to see that candidates used the scaffolding provided in several questions to help them structure their responses and there was a significant degree of annotations on diagrams and tables to help guide their responses. These examples of good practice were seen in work from candidates across the whole of the ability range.

A significant number of candidates confused the requirements for command words including 'describe' and 'explain'. 'Explain' questions were often partly answered as the candidate had only included a description in their response and it was also not uncommon to see a question using the command word 'describe' being extended to include an explanation. It was also noted that candidates scored less well on questions where they were required to apply their knowledge to adapting practicals and controlling variables. There seemed to be a larger number of poor and blank responses seen compared to paper one, which may reflect the pressures due to when 1BI0_2F was taken in comparison with other examinations.

Question 1 (a)(i)

Q1(a)(i) included an image representing the carbon cycle and required candidates to apply their knowledge to state how carbon is transferred from plants to animals. The majority of candidates failed to score here with a correct answer such as consuming, eating, digestion or absorption. Some candidates used words from the box for the next question with transpiration, translocation, photosynthesis being commonly seen. Other candidates wrote carbon transfer or energy transfer.

(i) Name the process that transfers carbon from plants to animals.

(1)

translocation

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Examiner Comments

A common incorrect response 'translocation' is presumed to have come from the 'use words from the box' following question.

ResultsPlus
Examiner Tip

The early questions tend to be quite straightforward and so if you do not know the answer straight away – think what is a simple way of describing, in this case, how the carbon in the plants gets into us.

Question 1 (a)(ii)

This question required candidates to choose words from the box to complete two sentences about the carbon centre. Surprisingly more candidates scored here for 'respiration' being how animals release carbon dioxide than photosynthesis being how plants use carbon dioxide from the atmosphere. The vast majority of candidates scored here with over half gaining both marks.

Question 1 (c)(i)

This question asked why water is filtered as part of the processes used to make it drinkable. Just over half of candidates scored the available mark with a variety of creditable responses including to remove lumps, solid particles, stones and bacteria. Common errors included to remove chemicals and repeating the stem to say to make it drinkable or potable.

(c) Water from rivers can be filtered and then treated with chemicals to make it suitable for drinking.

(i) Give **one** reason why water is filtered.

(1)

to remove ~~[illegible]~~ sediment

ResultsPlus
Examiner Comments

A good response – to remove sediment is a major reason why water is filtered as part of the process to make it drinkable.

(c) Water from rivers can be filtered and then treated with chemicals to make it suitable for drinking.

(i) Give **one** reason why water is filtered.

(1)

To make the water safe enough to drink

ResultsPlus
Examiner Comments

The stem of the question states that water is filtered to make it drinkable, so no marks awarded here.

ResultsPlus
Examiner Tip

There are no marks for rewording the question – here we are looking for why water is filtered to make it drinkable, so saying to make it safe to drink is not going to be creditworthy.

Question 1 (c)(ii)

Following on from Q1(c)(i), why is water filtered to make it drinkable, Q1(c)(ii) asks why are chemicals added to make water drinkable. Whilst a few candidates again rephrased the question, stating to make it safe to drink / drinkable, far more candidates scored here. Whilst most scored by stating to kill bacteria, other creditable answers seen were to control the pH, with a significant number saying to remove harmful chemicals and to add ions we need with some candidates being specific and stating fluoride ions for stronger teeth.

(ii) Give **one** reason why water is treated with chemicals.

(1)

to kill ~~ma~~ harmful bacteria. which makes the water drinkable

ResultsPlus
Examiner Comments

This response gets the available mark for stating to kill (harmful) bacteria but just throws in 'to make water drinkable' as an extra security point.

ResultsPlus
Examiner Tip

Keep your responses simple so that they answer the question. However, be as specific as possible in your answer without wasting time. Here bacteria is better than microorganisms and harmful tells the marker that the candidates understands why water has chemicals added to it to make it suitable for drinking.

Question 2 (a)(i)

This question discriminated well with more candidates losing a mark by joining 'plasma' to 'produce antibodies'.

There was a large increase in the number of candidates who drew multiple lines from each part of the blood box to more than one function thereby not gaining credit. It is suggested that the interruptions caused by the disruptions to education caused by Covid may have meant that candidates were not trained to avoid this error.

Question 2 (a)(ii)

Q2(a)(ii) supplied candidates with a photomicrograph of red blood cells. Candidates were required to apply their knowledge of red blood cells to state two features **that could be seen in the image**. This question discriminated well with roughly equal amounts of candidates scoring 0, 1 and 2 marks. Common answers were biconcave – although many candidates expressed this as having a dent / dip / hollow on each side. Some of these candidates gave eg dent on one side and a large surface which only scored one mark as they were the same marking point. Round and smooth were also commonly see creditable responses. Some candidates did not gain credit as being red or small could not be seen in the photomicrograph. No nucleus was credited as candidates could not see a nucleus in the image.

(ii) State **two** features that can be seen in the red blood cells in Figure 2.

(2)

1 High surface area to transport more oxygen.

2 Semi - permeable membrane, [illegible]

ResultsPlus
Examiner Comments

This candidate gains one mark for the high surface area but not for the permeability of the membrane as it cannot be seen in the image.

ResultsPlus
Examiner Tip

Read the question carefully – underline the key words – here there is the rider that the feature must be able to be seen in the red blood cells in figure 2. You will only get credit for fulfilling all of the question requirements.

(ii) State **two** features that can be seen in the red blood cells in Figure 2.

(2)

1 rounded shape

2 a curved shape in the center.

ResultsPlus
Examiner Comments

This response scores one mark for the 'rounded shape'. The curved shape in the centre is not quite enough for the concave / dip in the centre of the cell as curved shape could be talking about, for example, curving outwards.

ResultsPlus
Examiner Tip

Make sure that your response is clear – if the cell curves inwards, state that as otherwise the marker is doing the work to give credit.

Question 2 (b)(ii)

This maths based question asked candidates to calculate the diameter of a lymphocyte with a diameter of 10 micrometres when it is magnified 400 times. The answer line gave the desired units of micrometres so there was no requirement to convert units. Although very infrequently seen, if the candidate converted the answer to millimetres, they were credited with the full 2 marks as long as they stated the different units. It was pleasing to see that almost three quarters of candidates could calculate the correct answer of 4000 µm. As with many mathematics questions few candidates scored one mark as if they could get as far as stage one, they could invariably carry out the multiplication correctly.

A small lymphocyte has a diameter of 10 µm (micrometres). ← $\times 10^{-3}$

A microscope magnifies this lymphocyte 400 times.

(ii) Calculate the diameter of the image of the lymphocyte seen using this microscope.

(2)

1 mark

a – 10
m – 400 x = 400

image size 400 µm

ResultsPlus
Examiner Comments

A rare one mark question where the candidate shows that their working is 10 x 400, but then gives the answer as 400 instead of 4000.

ResultsPlus
Examiner Tip

Even if a calculation is a simple one, use a calculator / write the sum out to save losing a mark through a silly slip.

Even then – look at the answer and see if it makes sense.

A small lymphocyte has a diameter of 10 µm (micrometres).

A microscope magnifies this lymphocyte 400 times.

(ii) Calculate the diameter of the image of the lymphocyte seen using this microscope. (2)

Actual = image (?) / mag. (400) (10)

Image = actual × mag.

400 ÷ 10 = 40

10 × 400 = 4000

image size 40 µm

ResultsPlus
Examiner Comments

Even though this candidate has the correct answer amongst all the working out in the space provided, they have also got an incorrect calculation 400 ÷ 10 = 40. This is the answer that they have opted for and with 40 written on the answer line, we have to mark that response and therefore the candidate scores no marks.

ResultsPlus
Examiner Tip

The stem says magnifies this lymphocyte by 400 times, therefore think about what that information means – 400 times larger. This should guide you to multiply 10 by 400 to get 4 000 µm.

However, as an extra check, think, micrometres are small and so 40 µm is likely to be small – too small to see.

Question 3 (a)(ii)

This question required candidates to explain how the two structures labelled X (hair) and Y (erector muscle) on the cross section of the skin reacted when the body is cold. Almost half of the candidates failed to score any marks with many stating that Y was a blood vessel and that it would pump blood faster to the skin to make the skin warmer. Most candidates correctly identified structure X as a hair but a significant number could not state that it would become erect / stick up when the body was cold (MP1) which is how most candidates that scored, gained their mark. Another point could have been gained by stating that the raised hair trapped air (which was an insulator). There were no marks for simple stating 'warms the body' as it stated in the stem of the question that it was when the body was cold, and to be awarded the second mark, candidates had to explain about trapping (insulating) air / reducing heat loss.

(ii) Explain how structures X and Y help to regulate body temperature when the body is too cold.

(2)

structure Y senses when the body is cold which signals structure X and causes the hairs to rise.

ResultsPlus
Examiner Comments

A commonly seen response showing that candidates knew about hairs becoming erect when the body becomes cold but lacked understanding on how this occurred and why it helps maintain / increase body temperature.

ResultsPlus
Examiner Tip

On a topic like this, which is sequential, try different ways – eg constructing a flow chart to help you understand and recall what happens, why it happens and the consequences of the actions.

(ii) Explain how structures X and Y help to regulate body temperature when the body is too cold.

(2)

X is a hair that stands up to trap warm air. Y contracts your skin so the hair stand and tells you that you're cold.

ResultsPlus
Examiner Comments

The easy way to get both available marks. Know your structures and be able to state what they do.

Question 3 (a)(iii)

Most candidates scored well on this question, which showed good discrimination, with one mark being achieved by the highest proportion of candidates and about one fifth scoring both marks available. The question required candidates to explain how shivering helped regulate body temperature. Muscles contracting / moving was often seen with candidates having problems stating that this was involuntary. Some wrote without moving parts of the body about, whilst others wrote about muscles shaking back and forth. Few candidates stated marking point two and those that did gain two marks usually coupled MP1 with "which then warms you up".

(iii) Explain how shivering can help a person regulate their body temperature.

(2)

When you shiver, your muscles are contracting and relaxing repeatedly, resulting in you to warm up due to movement

ResultsPlus
Examiner Comments

This response can just about be awarded both marks available. The response could be improved by relating the muscles contracting to the idea that this happens subconsciously.

Question 3 (b)(i)

The vast majority of candidates scored here, correctly reading the highest temperature off the graph as 37.5 ^{o}C.

Question 3 (b)(ii)

Very few candidates failed to score on this graph interpretation question. Roughly three quarters of candidates scored one mark here for either stating that the temperature decreased overall, or the temperature fall in ^{o}C for each 2 hours.

This is a three mark 'explain' question and therefore required the candidates to state a cause for the drop in the temperature. Roughly one fifth of the candidates did suggest that the drop was due to the person being asleep / resting / not moving but very few candidates then linked the lack of activity with lower respiration rates / lower amounts of heat being generated.

(ii) Explain the change in body temperature from 0 hours to 4 hours.

(3)

The body starts off as a normal temperature. It then gradually decreases over 4 hours from 37°C to 36.26°C and the person becomes colder.

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Examiner Comments

A good, detailed description of the first marking point that the temperature fell from 0 to 4 hours. However an explain needs to link the fall in temperature to why the temperature decreased.

ResultsPlus
Examiner Tip

When the command word is **Explain** a change in data in a graph or in a table, you have to extend your answer to suggest why the change has occurred. Here the clue is that it is from midnight (written on the graph) to 4am so what will most people be doing then, sleeping / not moving very much.

(ii) Explain the change in body temperature from 0 hours to 4 hours.

(3)

During 0-4 hours, the person's body temperature drops to a low temperature rapidly. This happens because the body is using less energy while the person sleeps.

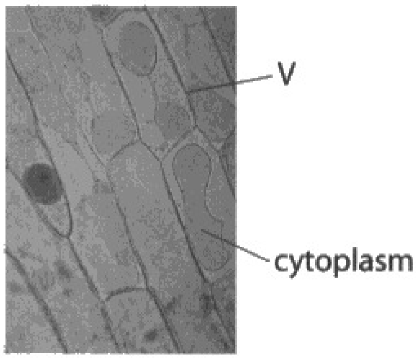
ResultsPlus
Examiner Comments

Marking points 1 and 2 are clearly met and using less energy is just enough to award marking point 3. Full marks gained.

Question 4 (a)(i)

Why cells are stained before examining them under a microscope has been asked in several previous examinations although not in this format. It was pleasing to see the vast majority of candidates scoring here with an answer of to see the cells more clearly, or to enable the cell structures to be seen. This is a core practical, clearly stated as an area to be examined in the advance information and so it was felt that to see the cells was insufficient as the onion cells are visible without being stained.

4 (a) Figure 5 shows some onion cells that have been soaked in a concentrated salt solution.



(Source: © Rattiya Thongdumhyu/Shutterstock)

Figure 5

(i) The cells in Figure 5 have been stained.

Give **one** reason why the cells have been stained.

(1)

So they show up better

ResultsPlus
Examiner Comments

Candidates should be trained to avoid words like 'better' as, although it was accepted here, 'better' can have different meanings to different people.

At the end of the exam, if there is time, check your work and change words like 'better' – to words that mean what you wish to say, for example here 'more clearly' is probably what the candidate meant.

Question 4 (a)(iii)

Candidates have often shown in the past that they find osmosis a difficult process to understand and explain. This question was no exception with candidates mainly stating that salt, or the salt solution moved. The question stated that the cytoplasm 'shrinks away' from the sides of the cell. A significant minority of candidates interpreted this as a conscious 'shrink away' from something that is eg scary and answers like 'the cytoplasm is scared of the salt solution and so shrinks to get away from it' were regularly seen. The term osmosis was very rarely seen.

(iii) The salt solution outside the cell has a higher concentration than the solution inside the cell.

Explain why the cytoplasm shrinks away from the sides of the cell when the cells are in salt solution.

(2)

Cytoplasm contains water. Water particles moves from an area of low ~~solvent~~ solute concentration to an area of high solute (salt) concentration by osmosis. Therefore, cytoplasm loses water, which moves out of the cell, and shrinks.

ResultsPlus
Examiner Comments

An excellent response showing a clear understanding of the process of osmosis gaining both available marks.

(iii) The salt solution outside the cell has a higher concentration than the solution inside the cell.

Explain why the cytoplasm shrinks away from the sides of the cell when the cells are in salt solution.

(2)

it dosnt want to be touchd by the salt
Solt makes its self smaler

ResultsPlus
Examiner Comments

When presented with a question where a cell is in a solution and is either getting larger or smaller, there will be marks for saying that water is moving in or out of the cell, and possibly a further mark for saying through the membrane. If the cell is getting bigger, water will be moving into the cell. If the cell is getting smaller, water is moving out of the cell.

Lastly. Don't forget to use the term **OSMOSIS.**

Question 4 (b)

Candidates were supplied with a reasonably large degree of scaffolding for this question in the form of an image showing the equipment to be used in preparing a microscope slide of onion cells. As a result there was a very good response with most candidates being able to gain all or most of the marks available. Marks were lost by not knowing the names of all the pieces of equipment. It was very pleasing to see candidates annotating the diagrams with instructions, for example '1. Put these onion cells on here' – with a drawn arrow going to the glass slide.

(b) Figure 6 shows the equipment used to prepare a microscope slide of onion cells.

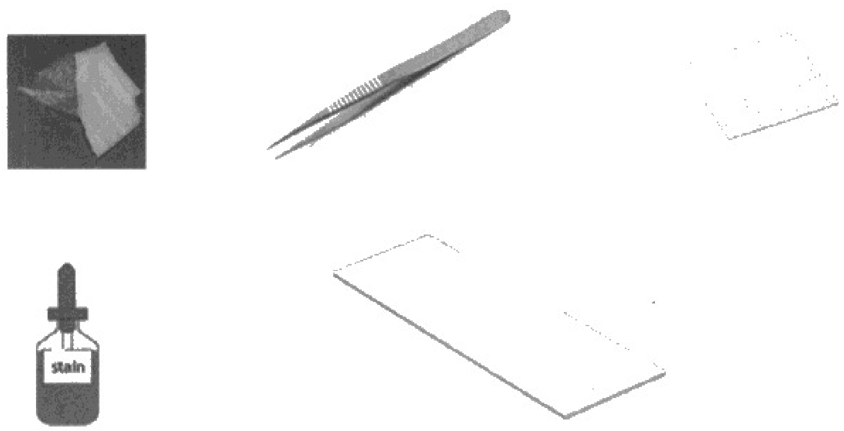


Figure 6

Describe how this equipment could be used to prepare a slide of onion cells to view under a microscope.

(3)

First you would need to peel a slice of onion ~~[illegible]~~ as thin as possible by using the tweesers. then you need to place a drop of Iodein (stain) onto the slide and place the thin peace of onion flat ontop then you need to cearfuly place the cover slip ontop of the onion so ~~the~~ it wont get dammaged.

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Examiner Comments

An excellent, detailed response showing the candidates knowledge about how to prepare a slide of onion cells for viewing under a light microscope.

Question 4 (c)

Q4(c) showed a graph of a student's osmosis investigation into the effect of different concentrations of sucrose solution on potato cylinders. Candidates were required to apply their knowledge of osmosis to state two conclusions that could be made from the information shown. Just under half the candidates failed to score on this question, with roughly half gaining one mark, mainly for describing the negative correlation shown in the graph. Very few candidates recognised the isotonic point and many that did referred to a concentration of eg 0.4 mol/dm^3, instead of 0.33 as specified for credit in the mark scheme.

(c) A student investigated the percentage change in mass of potato cylinders placed in sucrose solutions of different concentrations.

Figure 7 shows the results of the student's investigation.

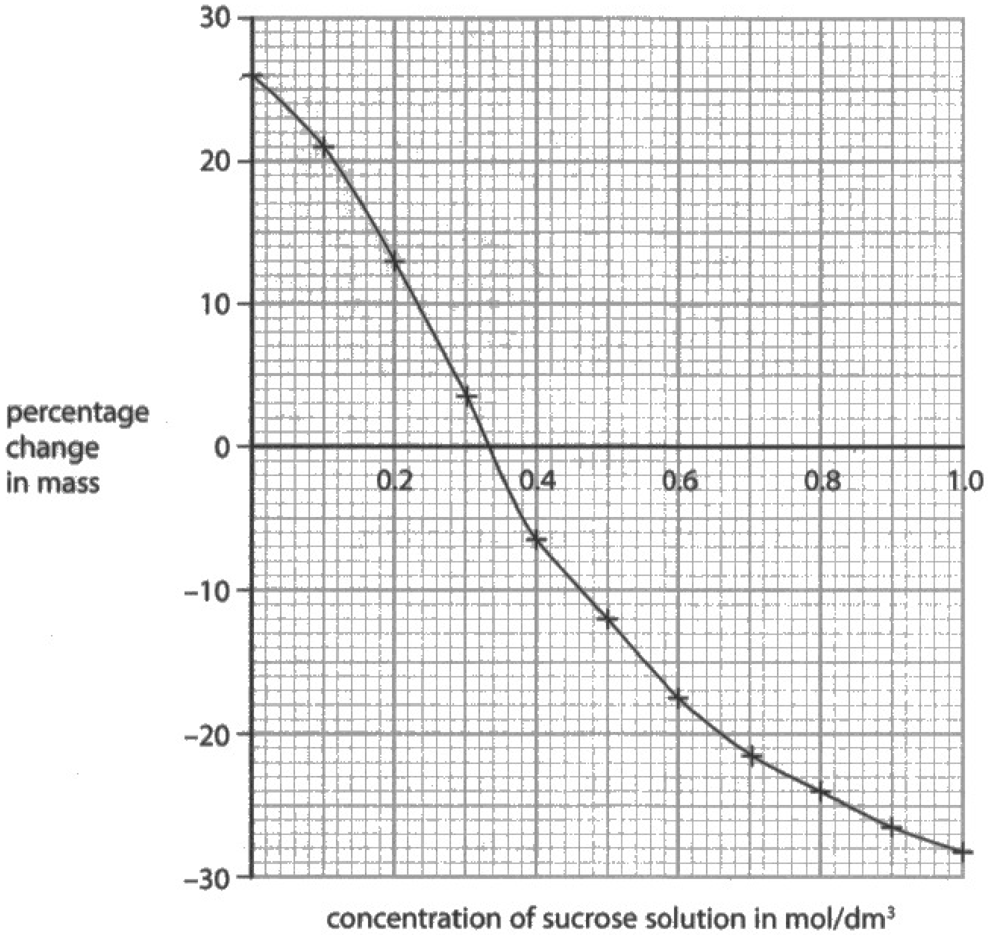

Figure 7

State **two** conclusions that can be made from these results.

(2)

1 The percentage change in mass starts at 25% and goes down to −30%

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Examiner Comments

When asked to comment on a graph, make sure that you refer to the labels for both axes. So here you need to relate the change in mass to the change in the concentration of the sucrose solution.

Furthermore, this graph clearly has two parts to it, the part above the X axis and the part below. You will find it easier to refer to the two parts separately, as well as possibly the point where it crosses the line, and you will probably gain more marks by doing so.

(c) A student investigated the percentage change in mass of potato cylinders placed in sucrose solutions of different concentrations.

Figure 7 shows the results of the student's investigation.

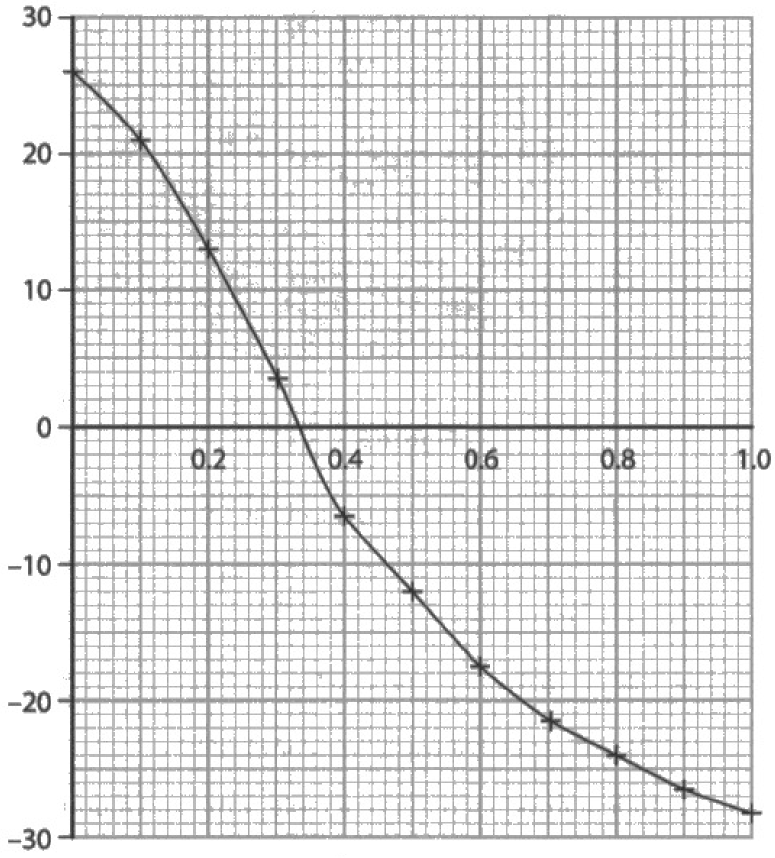

Figure 7

State **two** conclusions that can be made from these results.

(2)

1 A low concentration of sucrose can increas the mass of the potato.

2 Too much sucrose can decrease the mass of the potato.

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Examiner Comments

This candidate gains a mark for the general idea that below 0.33 mol/dm^3, the potato cylinders gain mass and above 0.33 mol/dm^3 the cylinders lose mass.

(c) A student investigated the percentage change in mass of potato cylinders placed in sucrose solutions of different concentrations.

Figure 7 shows the results of the student's investigation.

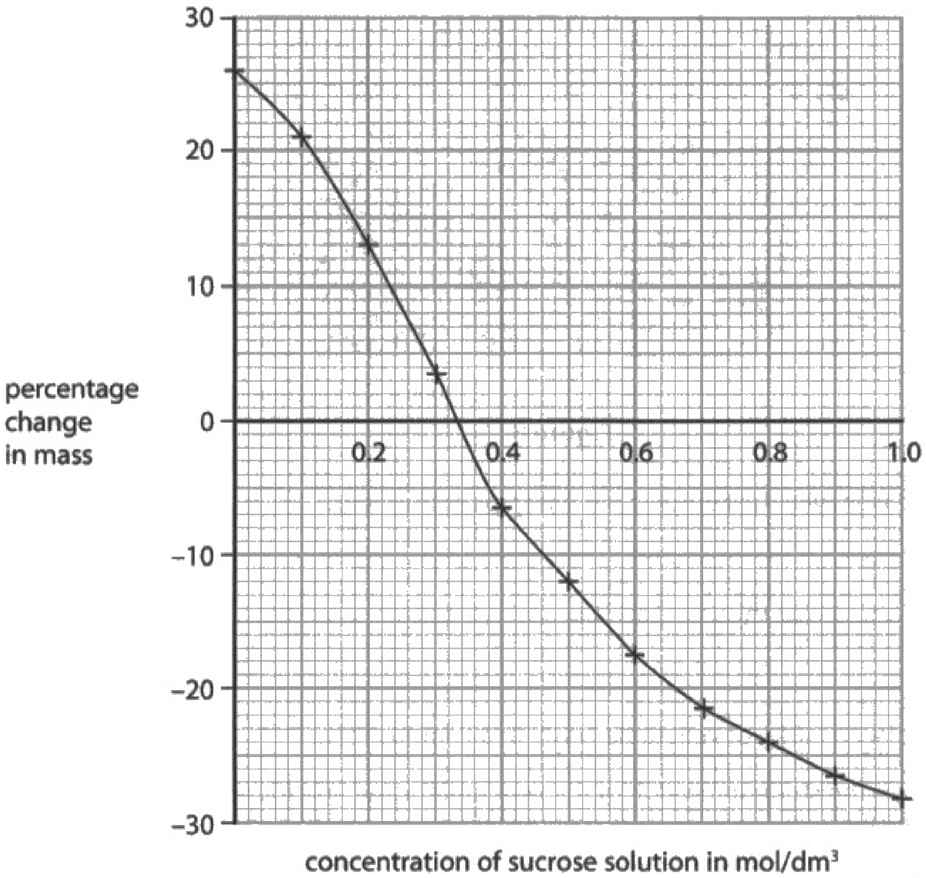

Figure 7

State **two** conclusions that can be made from these results.

(2)

1 The lower the concentration of sucrose solution the higher percentage change in mass

2 The higher the concentration of sucrose solution the lower percentage change in mass

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Examiner Comments

If you have a question asking for two different conclusions, don't give the same conclusion written in different ways. Here, conclusion 1 and conclusion 2 are saying the same thing, each being the reverse way of saying it to the other.

Question 5 (a)(i)

Why do compost bins have gaps in the sides? This question was accompanied by an image of a square, wooden compost bin with obvious gaps in the side. Roughly half the candidates scored the available mark here with to let oxygen / air in being seen more often than to let water / rain out. Incorrect answers tended to be around the idea of 'to let insects / animals in' although there were some clever answers that developed this idea to say that the insects will make tunnels that would allow decomposers to get into the compost quicker.

Question 5 (a)(ii)

This mathematical skills question required candidates to calculate the rate of decomposition of compost. Rate calculations have not been high scoring questions in the past and so an equation was included. This allowed greater access and roughly three quarters of the candidates managed to score all three marks available. Candidates that scored less than three marks usually did not subtract 1.7 from 2.0 to find the change in mass. A few candidates changed 0.015 kg to 15 g. This gained 2 marks as long as they changed the kg on the answer line to g.

(ii) A student placed 2.0 kg of vegetable waste in a compost bin.

After 20 days, the student reweighed the vegetable waste and found that its mass was 1.7 kg.

Calculate the rate of decomposition of the vegetable waste.

Use the equation

$$\text{rate of decomposition} = \frac{\text{change in mass}}{\text{time taken}}$$

(3)

$2.0 - 1.7 = 0.3$

$= \frac{0.3}{20}$

$= 0.015$

rate of decomposition = 0.015 kg per day

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This response, with clearly set out working gains all three marks. Candidates should be trained to set mathematical skills questions out like this so that if they make a transcription error or through poor handwriting, the 5 looks more like a 6, the whole response can be used to award marks.

(ii) A student placed 2.0 kg of vegetable waste in a compost bin.

After 20 days, the student reweighed the vegetable waste and found that its mass was 1.7 kg.

Calculate the rate of decomposition of the vegetable waste.

Use the equation

$$\text{rate of decomposition} = \frac{\text{change in mass}}{\text{time taken}}$$

(3)

rate of decomposition = 0.015 kg per day

ResultsPlus
Examiner Comments

This response also gains three marks, for the correct answer of 0.015kg.

However, we advise candidates to show their working as a transcription error, for example, loses all marks available.

Question 5 (a)(iii)

The majority of candidates gained one mark for saying that the increase in temperature from 20°C to 25°C would increase the rate of decomposition. A further significant number could then explain why this was by stating that there was more energy with some backing this up with good kinetic theory, with fewer candidates gaining the second mark by saying that enzymes would be working faster. This showed that the question worked well as a good discriminator. A small number of responses were seen that stated that raising the temperature would denature enzymes and so would lower / stop decomposition. Although not creditworthy, it showed that the vast majority of candidates accessed this question and tackled it along good scientific understanding.

(iii) The temperature in the compost bin increased from 20 °C to 25 °C.

Explain how this increase in temperature would affect the rate of decomposition in the compost bin.

(2)

- The higher temp increases the bacteria Production
- encourages the rate of decomposition.

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Examiner Comments

This response can be interpreted as:

- because of more bacteria (MP4).
- there is faster decomposition (MP1).

Therefore both available marks are awarded.

We try to credit correct science as far as possible and will interpret candidate's responses to be as fair as we can within the constraints of the standards set by the principal examiner and shown in the mark scheme and training.

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Examiner Tip

This response just gets both marks available – candidates should avoid using words like 'encourages' when they mean 'faster', 'increases' or 'goes up'.

Question 5 (b)

This question showed an image of some dried and some vacuum packed food. Candidates were asked to apply their knowledge to explain why these foods do not decompose. Roughly one quarter of candidates gained one mark with another quarter gaining two marks. Most of these stated that dried food didn't not have any water and / or that vacuum packed food did not have any oxygen or air present. To get three marks was quite hard for candidates, who needed to say that this was because decomposers needed eg oxygen for respiration / to survive. It is possible that candidates were trying to think of more complex reasons and missed the simple ones. Some candidates who scored three marks gained their third mark by stating that (biochemical) reactions occur in 'water'. To be credited, the candidates had to make it clear which food they were referring to.

(b) Figure 9 shows some preserved food that can be bought in a supermarket.

Dried food

Vacuum packed food

(Source: © Sarah Marchant/Shutterstock © Cultura Motion/Shutterstock)

Figure 9

Explain why these two types of preserved foods do not decompose.

(3)

Because for food to decompose It needs Oxygen, warmth and moisture if food is vacume Pact there is no oxygen for it to decompose and dried foodds do not contain moisture for it to decompose.

ResultsPlus
Examiner Comments

Candidates should make sure that, when they are writing about two or more parts of a question, they clearly identify which comment refers to which part, as is shown in this example.

Question 6 (a)(ii)

This data interpretation question asked candidates to use the data shown in the table to describe the effect of light intensity on the rate of photosynthesis. Candidates are used to this and the vast majority had little problem in stating that as light intensity increased, the rate of photosynthesis also increased. The second mark could be gained by manipulating data from the table to support their statement. Few candidates could manage this although many did quote data from the table saying, for example, that at a light intensity of 25 arbitrary units, there was 19 bubbles produced per minute and at 100 arbitrary units there was 222.

(ii) The rate of photosynthesis can be measured by counting the number of bubbles of gas produced in one minute.

Figure 11 shows some results from this investigation in different light intensities.

Light intensity was changed by moving the lamp towards or away from the water plant.

light intensity in arbitrary units	rate of photosynthesis in bubbles per minute
25	19
31	43
39	46
50	95
69	125
100	222

Figure 11

Describe the effect of light intensity on the rate of photosynthesis.
Use information from Figure 11 to help you.

(2)

as the light intensity increase the rate of photosythesis increases per minute

ResultsPlus
Examiner Comments

If a candidate is asked to describe a trend shown in data presented in a table and there are two marks available:

First look to see if there are any changes eg, does the data level off.

If not, and here there is no obvious change, then to gain the second mark the candidate will most probably have to manipulate at least some of the data. This could be either carrying out a subtraction or a division. Here you could say, for example, that when the light is four times brighter (100 ÷ 25), the rate of photosynthesis is 11.7 / about 12 times greater (222 ÷ 19).

Question 6 (a)(iii)

The idea of how to improve the quality of results for this investigation had clearly been discussed in class with around half the candidates scoring by saying one of 'video the investigation and play back the recording and count the bubbles', 'have two (or more) people counting the bubbles and calculate a mean' or 'collect the gas in a syringe and measure the volume' being frequently seen. Those that scored 1 mark tended to say the latter two ideas but did not develop the improvement to award both marks.

A simple and clearly written response to gain both available marks.

(iii) The bubbles are different sizes and can be difficult to count.

Describe how the quality of the results from this investigation could be improved.

(2)

Use a gas syrige to collect the gas and measure the volume.

ResultsPlus
Examiner Comments

This is simple and clearly written. Candidates should be encouraged to state responses, such as here, succinctly.

Question 6 (a)(iv)

It was pleasing to see responses here that were excellent and covered all the marking points in detail. However, many candidates still have problems when asked to change / adapt an investigation to find the effect of a different parameter. This did discriminate fairly well between candidates that scored 1 mark with those that scored 2 or 3 marks. This question asked candidates to adapt the light intensity on the rate of photosynthesis to investigate the effect of changing temperature. There is an argument to keep this simple. Almost half the candidates could not start with do the investigation the same but at a range of different temperatures. Adding 'but don't change the light intensity' would have gained a second mark. For changing the temperature, we credited responses such as do this again at 10°C, 20°C and 30°C.

A good, if basic, clear 3 mark response.

(iv) Describe how this investigation could be changed to find the effect of temperature on the rate of photosynthesis.

(3)

heart the beaker in a water bath with a thermostat in different temperatures and makes sure the amount of light in the room doesnt change.

ResultsPlus
Examiner Comments

When asked to change an investigation to explore a different parameter state / describe how you are going to change the new parameter, giving a sensible range.

Here, state, do the investigation again but at different temperatures, then state that whatever was changed should be kept constant and finally add some detail, eg we are using a thermometer to measure a temperature, using a water bath (which controls the temperature more easily than intermittent use of a Bunsen burner).

Question 6 (b)

Eutrophication is an area of the specification that has steadily seen improving understanding over this specification series. It was pleasing therefore to see that it was still well understood by candidates although there was a marked decrease in the ability to describe the consequences of eutrophication with correct biological terminology.

Q6(b) asked candidates to apply their knowledge to explain how eutrophication could affect the fish in a lake. MP1 was often awarded although very few used the term algal bloom or the idea of excessive overgrowth with many gaining this marking point by stating that eutrophication causes algae to grow over the surface of the lake. Frequently awarded marking points were MP2, and MP4 – less light gets to plants lower in the water and there is less oxygen in the water. MP5 – fish die and the fish population decreases was seen regularly and a significant number of 'fish move to other parts of the lake' were seen suggesting that at least some candidates had been prepared by using a past 2F examination where that was a marking point. Candidates tended to know the minimum, usually algae grows faster, or they knew a lot and gave an excellent account covering all the marking points meaning that more candidates scored 1 or 3 marks. It was disappointing, however, that many candidates did not try to address the focus of the question, how does eutrophication affect fish living in the lake. There are only a few possibilities, including they increase in number, they decrease in number, they get ill, they move away. Candidates need to be trained to have a go at answering the question.

(b) Increased nitrates can cause eutrophication in lakes.

Explain how eutrophication will affect the fish living in the lakes.

(3)

It would cause the fish to ~~g~~ recieve/get less oxygen. which could cause the fish to die. ~~E~~ The nitrates would increase growth for ~~th~~ plants that grow on top of the lake. which would mean ~~the~~ that no ~~oxyg~~ light reaches the plants below at the lake. Those plants won't be able to photosynthesis and take in CO_2 and ~~tr~~ release oxygen. which would mean the fish can't respire ending with the fish dying because lack of oxygen.

ResultsPlus
Examiner Comments

This candidate has obviously read the question as they have addressed the question first, how are the fish affected, and then explained why, comprehensively gaining all three marks available.

Question 7 (a)

Roughly half of the candidates gained one mark here, mainly for being able to label the bladder. A further significant minority also correctly labelled the ureter. As expected, the ureter was often left unlabelled and there was a degree of confusion between labelling it ureter or urethra.

Question 7 (b)(ii)

Q7(b)(ii) asks candidates to explain the conclusions that could be made from the data shown in the table which listed two components of blood plasma that could be passed into the kidney nephron and two that couldn't. Some candidates had difficulty in accessing this question and restated the points in the table, that blood cells and large proteins are not found in the nephron and that glucose and sodium ions are found in the nephron for no credit. To gain credit, candidates had to show an understanding of filtration from the glomerulus into the Bowman's capsule and state that the former were too large to pass through eg the membrane, and that glucose and sodium ions were small enough to pass through these structures.

(ii) Figure 13 shows which components of the blood are filtered into the nephron.

blood component	is the component filtered into the nephron?
blood cells	no
large proteins	no
glucose	yes
sodium ions	yes

Figure 13

Explain the conclusions that can be made from this information.

(2)

Glucose and sodium are filtered out of the blood

ResultsPlus
Examiner Comments

The word 'explain' means that you need to give a reason why, in this example, glucose and sodium (ions) can pass through the membranes because they are small / very small / smaller than the holes in the membranes / equivalent.

(ii) Figure 13 shows which components of the blood are filtered into the nephron.

blood component	is the component filtered into the nephron?
blood cells	no
large proteins	no
glucose	yes
sodium ions	yes

Figure 13

Explain the conclusions that can be made from this information.

(2)

- ~~large proteins and bloodcells are less necessary for the body than glucose and sodium ions are.~~
- Sodium ions and glucose will be removed from the body alongside urea, if any are left over. not written below
- bloodcells and large proteins are too big to be filtered

ResultsPlus
Examiner Comments

The first part of the response here is just restating what is in the table. The comment about urea can't be concluded from the information in the table and so also gains no marks.

The second bullet point is an explanation which correctly explains the first two parts in the table and so gains one mark.

Question 7 (c)

This is the first of the two six mark, extended prose responses in the paper. It required candidates to discuss the uses of different treatments for kidney failure. Six markers are categorised as level 1, 2 or 3 based on the guidance set out in the mark scheme. Then the answers are looked at again and the mark within the assigned level is awarded. The command word here is 'discuss' and what is more, discuss the different treatments for kidney failure. Therefore, the candidates had to refer to consequences of both types of treatment to achieve more than level 1. Just describing the treatments was not answering the question. To get to level 3, the candidate had to address consequences of both main types of treatment for kidney failure, with the need to supply some detail in the response to be awarded all six available marks. The modal level was level 1 and the modal score was 2 with most of these candidates referring to both types of treatment without sufficient detail or just describing one type of treatment in more depth. It is felt that this question worked well being accessible to the vast majority of the candidates and with a reduced number of candidates being awarded level 2 and slightly less being awarded level 3. In both these levels the number of candidates getting each of the sub level marks was roughly equal. It was rewarding to see some excellent responses outlining in depth, rejection and effects of dialysis on lifestyle.

*(c) It is estimated that about 3 million people in the UK are at risk of developing chronic kidney disease (CKD).

The most severe stages of CKD can result in kidney failure.

Discuss the use of different treatments for kidney failure.

(6)

transplant and ialusis is the 2 ways of treating CKD

transplant is the cheapest option where as diala sis costs the NHS thousand every year. but you have a risk of the kidney rejecting you.

ResultsPlus
Examiner Comments

This candidate refers to both dialysis and transplant. However, they only refer to two consequences, one being that a transplant is cheaper than dialysis, and the other being the risk of rejection with transplants (even if they got who is rejecting what the wrong way round). This is just sufficient detail to award level 2, 4 marks.

*(c) It is estimated that about 3 million people in the UK are at risk of developing chronic kidney disease (CKD).

The most severe stages of CKD can result in kidney failure.

Discuss the use of different treatments for kidney failure.

(6)

People use the different types of Kindines for the dalysis kindey failure happen when kindey stop work and it caused you alot of Proplums.

ResultsPlus
Examiner Comments

A very basic response, just mentioning dialysis, thereby resulting in just one mark being awarded.

Question 8 (a)(i)

Roughly half of the candidates scored here, with almost all correctly identifying the cell part C on the diagram of the root hair cell as the vacuole.

Question 8 (a)(ii)

This question asked candidates to explain one adaptation of a root hair cell.

Considering there was a diagram supplied to focus candidate's on the structure of a root hair cell, this was poorly answered with less than half the candidates scoring. There were two ways to obtain marks:

- state that it was long, which increased the surface area / has a large surface area so increased the **rate** of absorption.
- the cell wall is thin, so the distance water / mineral ions have to travel is less, so the **rate** of absorption increases.

The vast majority of candidates that scored opted for the root hair cell being long option, but few of these gained the second mark just stating that this increased the amount of water absorbed, which was not creditable as the stem of the question included '...that increases the absorption of water and mineral ions'.

(ii) Explain **one** adaptation of a root hair cell that increases the absorption of water and mineral ions.

(2)

The root hair cell has a large surface area helping it to absorb more water and mineral ions

ResultsPlus
Examiner Comments

This scores one mark. Read the question carefully and underline key parts such as the command word and the salient information given. Here the key phrase is 'that increases the absorption of water and mineral ions'. Just rephrasing this in the answer – 'to absorb more water and mineral ions' is not going to be creditworthy.

(ii) Explain **one** adaptation of a root hair cell that increases the absorption of water and mineral ions.

(2)

· Elongated - the root hair cell can reach further for water and minerals

ResultsPlus
Examiner Comments

This answer, however, does not just state absorb more water and mineral ions but gives a reason why more water and mineral ions are absorbed so gets the second mark available.

Question 8 (b)(ii)

A diagram of xylem and phloem was included in the introduction to part 8(b) and candidates were asked to describe two features of the structure of xylem vessels that could be seen in the diagram.

Most candidates that scored did so by stating that xylem walls are thicker (than the phloem walls), with a small number of these going on to say that there were no cross walls or that the cells are dead / hollow.

(ii) Describe **two** features of the structure of xylem vessels that can be seen in Figure 15.

(2)

1 Thick cell wall due to high pressure

2 fast flow in one direction.

ResultsPlus
Examiner Comments

'Describe' questions do not need a reason so thick cell wall was enough for credit in reason 1.

Reason 2, fast flow in one direction is not credited as fast flow cannot be seen in figure 15 and one direction may be a feature of xylem, but it is not a feature of a structure as required in the stem of the question.

(ii) Describe **two** features of the structure of xylem vessels that can be seen in Figure 15.

(2)

1 the have a long hollow tube which water can flow through

2 the xylem cell has lignin which help the xylem cell withstand pressure from the movement of water

ResultsPlus
Examiner Comments

Xylem being a hollow tube scores one mark, MP2. Being made from lignin was creditable, see additional guidance, as the thickness of the xylem cell wall is part of lignification so can be seen.

Question 8 (c)(i)

Q8(c)(i) worked quite well as a discriminator. It asked candidates to apply their knowledge of transpiration and diffusion to explain why a plant takes up more water when an adjacent fan is switched on.

MP1, air flow is increased should have been an easy first mark for all candidates but over two fifths of candidates did not get awarded this mark as, for example, they talked about the fan blowing water into the leaves and even into the roots of the plant.

Some excellent responses were seen here with clear and logical sequences seen explaining how if water vapour around the leaves was moved away by the 'wind' from the fan, that more water would transpire / diffuse out of the leaves through the stomata which meant that more water was drawn up the xylem so that the plant took up more water to replace it, although the majority of responses seen that scored all three marks available did not include all of the listed points.

(i) Explain why switching on the fan caused a change in the volume of water taken up by the plant.

(3)

When the fan was Switched on the flow of air was faster which aloud the plant to take up more water.

ResultsPlus
Examiner Comments

This is a good sensible answer, which gained two marks. When answering an 'explain' question like this, start with stating what the change does, here 'switching the fan on' 'makes the air flow faster'.

Also say how the change affects the question. Here – the question asks about the change in the volume of water being taken up by the plant, and here the candidate gains the mark for choosing it increases the uptake of water.

Question 8 (c)(ii)

This question tested whether the candidates understood that when an investigation is conducted, it is necessary to compare results to a 'baseline'. It was pleasing to see a few candidates using the term 'baseline measurement' although most gained the available mark by saying as a control, or so that the effect of the fan can be seen, or to compare the results (to when the fan is switched on).

Question 8 (c)(iii)

This mathematical skills question again tested the candidates ability to calculate rate. Again the equation required was given.

Candidates had to first use the table to extract the volume of water taken up at 8 and 10 minutes and calculate the difference. Then for the second mark, divide the water taken up by 2 to calculate the rate per minute. The majority of candidates scored here. A third of those scoring just one mark, gained it by dividing any number, other than 16, from 0 to 70 (as possible readings from the graph) by 2 as this showed that they knew that they had to find the rate and not just the amount.

Question 9 (a)(i)

Figure 17 showed a photomicrograph of the cross sections of an artery and a vein. Q9(a)(i) asked the candidates to apply their knowledge of blood vessels to explain one difference that could be seen in the image.

This was an accessible question, with few blank responses and discriminated well with the majority of candidates gaining one mark and a significant number gaining both marks available. Almost all of these referred to the wall being thicker with a few adding more muscular. Those that scored two marks clearly showed that they knew that arteries carried blood under more pressure than veins which is why the wall needs to be thicker. Some of these stated 'to pump blood under higher pressure' which was not penalised.

9 (a) Figure 17 shows a cross-section of an artery and a vein.

(Source: © The University of Kansas Medical Center)

Figure 17

(i) Explain **one** difference between the artery wall and the vein wall shown in Figure 17.

(2)

The artery wall is very thick and muscly to endure high blood pressure where as the vein wall is smaller as it's blood pressure is much lower.

ResultsPlus
Examiner Comments

A good, clear response that gained both marks available.

9 (a) Figure 17 shows a cross-section of an artery and a vein.

(Source: © The University of Kansas Medical Center)

Figure 17

(i) Explain **one** difference between the artery wall and the vein wall shown in Figure 17.

(2)

the artery wall is thicker due to higher pressures.

ResultsPlus
Examiner Comments

This response gets both marks available. The question asks about a difference between the artery wall and the vein wall, so thicker artery wall must mean thicker than the vein wall. However, this is not always the case and candidates should be encouraged to write 'thicker than xxx' rather than just 'thicker'.

Question 9 (a)(ii)

It was disappointing that less than one fifth of candidates knew that valves are found in veins and not in arteries, with many possibly using the image of the cross section of the artery and vein and stating that the vein had a thinner wall which did not answer the question.

Question 9 (b)(i)

This mathematical skills question required candidates to calculate the volume of blood flowing through the muscles during exercise. To enable the candidates to calculate this, they were supplied with the data needed, including the percentage of blood in the muscles during exercise. Just over half of the candidates calculated the volume correctly, gaining the two marks available. A small percentage only gained one mark, some of these used 'chunkig' to calculate the percentage and made a small mistake.

Candidates should be trained to check their answer to see if it is reasonable. It was not uncommon to see candidates writing eg 300 dm^3 flowed through the muscles when the candidates were told that there was only 5 dm^3 in the body.

Question 9 (b)(ii)

This 2 mark 'explain' question required candidates to link either the need for more oxygen to the need for more energy / increased respiration, or the need to remove more carbon dioxide / lactic acid to the idea that these are products of (increased) respiration in the muscles. Many candidates found this hard to access with higher than average blank responses seen and those that did write a response tending to say that it was because the muscles were working harder. About one quarter of candidates did score a point by stating that the muscles needed more oxygen although few took this further to state why oxygen /more oxygen was required. Hardly any responses were seen with the more correct reason of to get rid of the extra carbon dioxide produced.

(ii) Explain **one** reason why there is an increase in blood flow to muscles during exercise.

(2)

Muscles need a higher amount of oxygen, as they are being used a lot, they need more energy from respiration.

ResultsPlus
Examiner Comments

A good response to an 'explain' question stating a basic reason and then explaining why the reason is required.

(ii) Explain **one** reason why there is an increase in blood flow to muscles during exercise.

(2)

you need more blood to travel to your muscles when exercising because if not your muscles wont work properly.

ResultsPlus
Examiner Comments

This response gains no marks as the first part merely restates the stem of the question and the second part is too vague for credit.

Question 9 (c)

This was the second of the six mark, extended response questions in paper 2F. Candidates were supplied with a diagram showing the cross section of a human heart with the left ventricle and a valve labelled to help focus the candidates on what was required.

Q9(c) required candidates to link the functions to the different structures of the heart. Levels were assigned as were marks within the levels based on the indicative content as outlined in the mark scheme. It was disappointing that a significant number of candidates could not reach level 1 as they wrote about the heart putting oxygen into the blood as it is needed, the heart putting carbon dioxide into the blood as it is needed and also that the heart was where you felt things like stubbing your toe as a string links the toe to the heart and when you stub it, the string pulls the heart which makes it hurt. There were also some very good responses showing that candidates understood how the different parts of the heart were related to their functions. Although there was reasonable discrimination shown by candidates, there tended to be more even marks than odd ones in levels 2 and 3. This is thought to be because candidates tended to be able to link functions with their concomitant structures together rather than knowing isolated structures or functions. Level 1 was mainly gained by candidates stating that the heart pumped blood often linked to the (muscular) wall contracting or just stating that valves stopped backflow. Levels 2 and 3 were achieved by hitting the full range of indicative content although valves and backflow, the left hand side pumping oxygenated blood to the 'body' (other than the lungs), the right hand side pumping deoxygenated blood to the lungs and named blood vessels carrying blood to / from named parts of the heart / body featured more commonly than the rest.

*(c) Figure 18 shows the structure of the human heart.

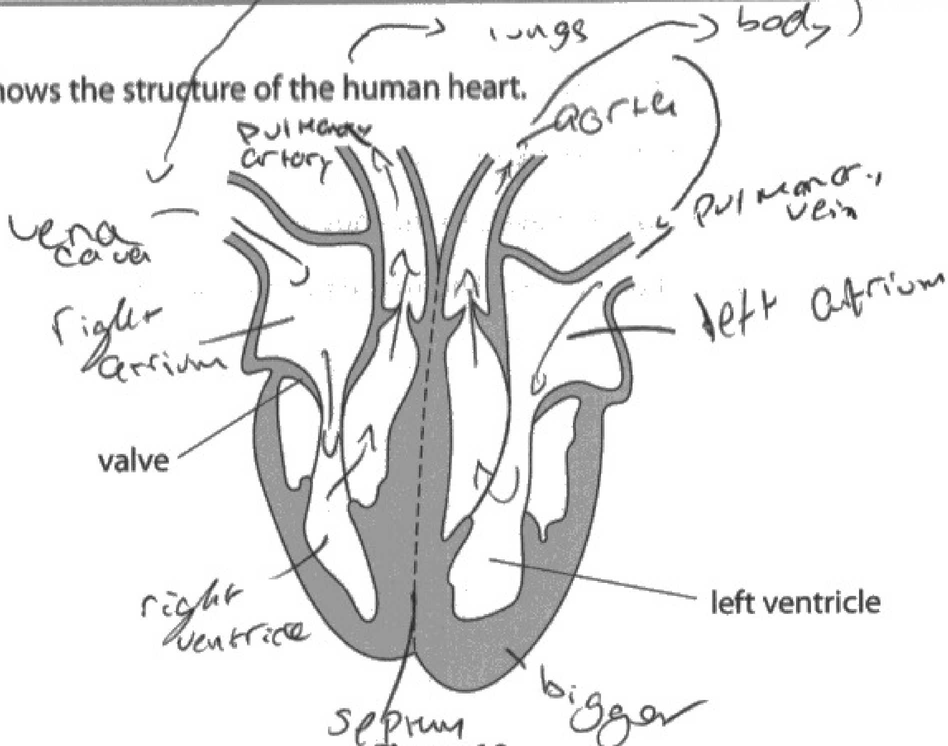

Figure 18

Explain how the structure of the heart is related to its function.

(6)

the left slide is thicker because it has to pump the blood around the whole body. values stop back flow of blood. Seprum sperates the left and right. Vena Cava and pumonary vein are ~~[illegible]~~ veins aorta and pulmonary artery are arteries. vein takes blood in. Aorta takes blood away

ResultsPlus
Examiner Comments

This response is awarded level 3, 6 marks. The left side being thicker linked to **whole** body is enough to allow thicker generates more pressure and is strengthened by the annotation on the diagram showing the blood from the right side going to the lungs, valves stop backflow, the septum separates the right and left side, the annotations show that the left pumps blood to the body and the right to the lungs, with several named blood vessels the aorta is taking blood to the body.

ResultsPlus
Examiner Tip

When presented with a diagram add labels, but also add functions / descriptions as this candidate has done. We do look at diagrams, tables, graphs for information that show understanding and knowledge which we will reward if it answers the question.

Another level 3, 6 mark response showing good practice.

*(c) Figure 18 shows the structure of the human heart.

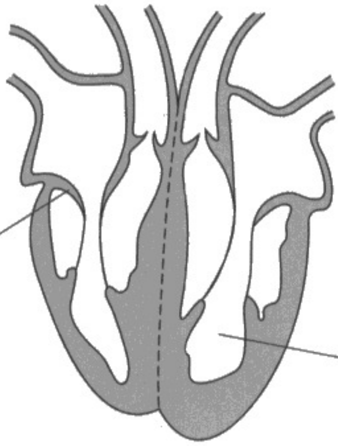

Figure 18

Explain how the structure of the heart is related to its function.

(6)

- there is a septum in the middle to keep the oxygenated and deaoxygenated apart.
- the left side has a thicker muscle to pump blood around the whole body
- the valves are there to prevent backflow in blood.
- the left side of the heart carrys oxygenated blood
- The right side has deoxygenated blood so has to pump it into the lungs then back to the left side of the heart.

ResultsPlus
Examiner Comments

Candidates should be encouraged to use whatever tools help them to organise their thoughts and responses. Here, bullet points have been used to keep points separate but they can also be used to quickly check that each part satisfies the requirements of the question.

Question 10 (a)

Question 10 started with sampling in a wooded ecosystem and Q10(a) showed a diagram of a nettle and asked why the student always measured the fourth pair of leaves on each plant sampled. This was poorly answered with less than one tenth of candidates scoring the available mark – so that the student could compare the size of the nettle leaves in the two areas, although the other acceptable answer seen was that they were the same age.

(a) Give **one** reason why the student always measured a leaf from the fourth pair of leaves.

(1)

to keep the variable controlled

ResultsPlus
Examiner Comments

A good response, controlling variables is a response that should have been used by more candidates as this is something that is stressed in practicals in the centre's laboratory.

ResultsPlus
Examiner Tip

When given a question about keeping something the same in a practical, whether in the laboratory or in an ecological investigation, think: is this controlling a variable that would also affect the result.

The diagram shows that the other leaves are different sizes and so to compare the first leaves in the shaded area and the 6th pair in the unshaded area would have two variables changing and so you would not be able to state which one caused the difference.

(a) Give **one** reason why the student always measured a leaf from the fourth pair of leaves.

(1)

So it was a valid test. That each leaf had the same amount of time to develop in their areas, rather than the bottoms which may only just produced and hadn't had enough time to grow

ResultsPlus
Examiner Comments

This gets one mark as it is a longer way of stating that the leaves measured in both areas will be about the same age, so can be compared.

Question 10 (b)(ii)

A small but significant number of candidates did not score here as they decided what the result was instead of looking at the results stating that the leaves in sunlight were larger usually linked to more light allows more photosynthesis which gives more energy for growth. Two thirds of candidates that did score here mainly got one mark for the easy statement that the leaves in the shaded area were larger than those in the sunlit area. Most of these candidates then had trouble in expressing themselves with relatively few being able to say that the shaded plants needed larger leaves to compensate for the lower light intensity.

(ii) Explain the difference in the mean width of leaves in the shade and those in the sunlight.

(2)

In the shaded area the leaves are wider whereas in area B the leaves arent as wide.

ResultsPlus
Examiner Comments

This point has already been made in earlier questions but if there are two marks available, make your two statements different rather than just the reverse of each other and as this is an 'explain', it requires a reason to support the point made that shaded leaves are wider.

(ii) Explain the difference in the mean width of leaves in the shade and those in the sunlight.

(2)

the ones in area a where wider because they recieve more sunlight where as areaB ~~that~~ aren't as wide because they don't get much sunlight

ResultsPlus
Examiner Comments

In a question like this where you have two areas, A and B with one shaded and one in sunlight, **write on the table of results** shaded by area A and sunlight by area B.

The first mark is awarded for stating wider in area A but then the reason given is wrong as the two areas shaded and sunlit are the wrong way round.

(ii) Explain the difference in the mean width of leaves in the shade and those in the sunlight.

(2)

Area A has bigger leaves because it needs to gird and absorb as much Sunlight as posable but Area B is always in the Sun not needing to be that.

ResultsPlus
Examiner Comments

A good two mark response.

Question 10 (c)(i)

This question required candidates to draw a food chain based on the observation of feeding relationships of animals in the wood. About one third of the candidates drew the food chain correctly, but then had the arrows pointed the wrong way, thus only gaining one mark. Other candidates were not awarded full marks as they used dashes instead of arrows or did not include all the organisms. Correct pyramids showing all the organisms were awarded 2 marks.

(c) The student also studied some of the animals in areas A and B.

The student saw caterpillars eating the leaves of some nettles.

The student also saw a toad eating a large beetle.

Large beetles eat ladybirds.

Ladybirds eat caterpillars.

(i) Give the food chain for these feeding relationships.

(3)

Nettels → Catepillars → Large beetle → ~~ta~~ Tood

ResultsPlus
Examiner Comments

Two marks are awarded here as the candidate has missed out ladybirds.

ResultsPlus
Examiner Tip

Check carefully that you have included all the information given. One way to check that all have been included is to cross out the points of information used.

(c) The student also studied some of the animals in areas A and B.

The student saw caterpillars eating the leaves of some nettles.

The student also saw a toad eating a large beetle.

Large beetles eat ladybirds.

Ladybirds eat caterpillars.

(i) Give the food chain for these feeding relationships.

(3)

~~Toad → Large beetle →~~

Toad → Large beetle → Ladybirds → Caterpillars → Nettles

ResultsPlus
Examiner Comments

A lot of effort put in to drawing the lovely diagrams of the organisms but this response only gains one mark as the arrows are drawn in the wrong direction.

Question 10 (c)(ii)

This last mathematical skills question tested candidates abilities to calculate the percentage efficiency of energy transferred from large beetles that are eaten by a frog. The data was displayed in a Sankey diagram. As with any mathematical calculation question candidates tended to get either no marks or both as they could either do the calculation or could not do the calculation, with just a few candidates gaining one mark for using 690J, the energy used by the frog instead of 750J, the energy transferred from the beetles.

(ii) Frogs also eat large beetles.

Figure 21 shows the energy transferred between these animals.

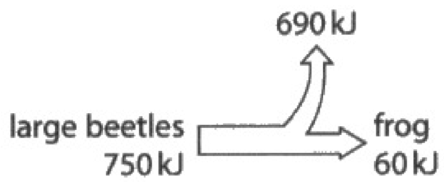

Figure 21

Calculate the percentage efficiency of energy transfer from the large beetles to the frog.

(2)

$$\frac{690}{750} \times 100 = 92$$

92 %

ResultsPlus
Examiner Comments

Here, one mark is awarded for using the wrong figures from the Sankey diagram but multiplying that answer to give a percentage energy transfer.

Question 10 (c)(iii)

The last question asked candidates to give two reasons why only some of the biomass in the beetles is transferred into the biomass of the frog. Roughly half of the candidates scored here with the first four marking points being seen regularly. The last marking point tended to be only partially written and unqualified by candidates saying just 'lost as heat' or 'lost to the surroundings'.

(iii) Give **two** reasons why only some of the energy in the biomass of the large beetles is transferred to the biomass of the frog.

(2)

1 because some is lost into the surroundings

2 the beetle and the frog are different organisms

ResultsPlus
Examiner Comments

No marks are awarded here as the first point made is unqualified and the second does not answer the question.

ResultsPlus
Examiner Tip

At the end of the examination, if you have time, check your answers but don't just read your responses, ask yourself questions like: Does this answer the question? Can I add a word to make what is written clearer?

(iii) Give **two** reasons why only some of the energy in the biomass of the large beetles is transferred to the biomass of the frog.

(2)

1 The mass is lost due to respiration

2 The mass is lost due to ~~d~~ excretion

ResultsPlus
Examiner Comments

Two good, clear reasons gaining both marks available.

Paper Summary

Based on their performance on this paper, candidates should:

- note the command words that are used in each question.
- use previous examinations and mark schemes to ensure that they are familiar with how questions are written and that you know what is required for command words including 'describe', 'explain' and 'discuss':
    - 'describe' means that they should write about how something is structured, set up or say how the trend in the data in a table or graph has changed / stayed the same.
    - 'explain' means that they need to use words like 'because' or 'so' to link the descriptive part of an explain question to why something has been set up the way it has or why it has changed.
    - 'discuss' means that they need to write about a topic in detail giving different ideas and considerations to the topic in question.
- use all the information given in the question to help them construct their answer but avoid repeating the information which has already been given or giving vague responses.
- consider the overarching context of the question to ensure they apply their scientific knowledge to the question being asked.
- check the numbers available for each question and try to write a different point for each mark.
- ensure that they know the core practicals in detail and how to change them to improve the quality of results or investigate a related parameter.
- use scientific terminology accurately where possible in responses, if there is time at the end of the examination, go through and change vague words such as 'it', 'they', and 'amount' to more specific words that say what you are referring to more clearly.
- always show your working as there are usually marks for parts of the calculation and for errors carried forward.
- annotate tables and diagrams, we will credit appropriate points wherever possible.
- draw straight lines on graphs to read the data from the axes more accurately.

Grade boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:

https://qualifications.pearson.com/en/support/support-topics/results-certification/grade-boundaries.html

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