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June 2022

GCSE Biology 1BI0 1F

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June 2022

Publications Code 1BI0_1F_2206_ER

Introduction

Paper 1BI0_1F is taken by candidates doing GCSE biology as part of a linear assessment model at the end of the course. The paper consists of 100 marks assessed by a variety of questions including multiple choice, short answer and two extended open-response questions worth six marks each. Candidates should answer all questions in a time period of 1 hour and 45 minutes. In the extended open-response questions marks are also awarded for the ability to structure a response logically; these questions are marked with an asterisk (*). In addition, the biology specification assesses practical knowledge and maths skills in the papers; these requirements are given in the specification. There are eight core practicals in the specification, which candidates must complete during the course. Candidates need to use their knowledge and understanding of these practical techniques and procedures in the written assessments.

The summer 2022 1BI0_1F paper contained questions assessing the content of topics 1 to 5. This included questions on pathogens and disease, the immune system, evidence for human evolution based on stone tools, pentadactyl limbs, the theory of evolution, non-communicable diseases, selective breeding, cell division, the structure and function of the eye, defects of the eye and DNA structure.

Questions on practical work included devising a plan to investigate the effect of pH on the activity of an enzyme, DNA extraction and controlling variables. Candidates of all abilities were able to access these questions, but their responses sometimes reflected a lack of first-hand experience. When discussing the control of variables, candidates should use terms including mass and volume accurately.

The maths skills that were assessed included using a graph to calculate the difference in risk of two people developing cirrhosis of the liver, interpreting a percentile chart, calculating the number of people diagnosed with a disease and calculating the time an impulse takes to travel the length of the optic nerve. Most candidates could access these questions, but candidates need to practice using population data and unit conversion, such as millimetres to metres.

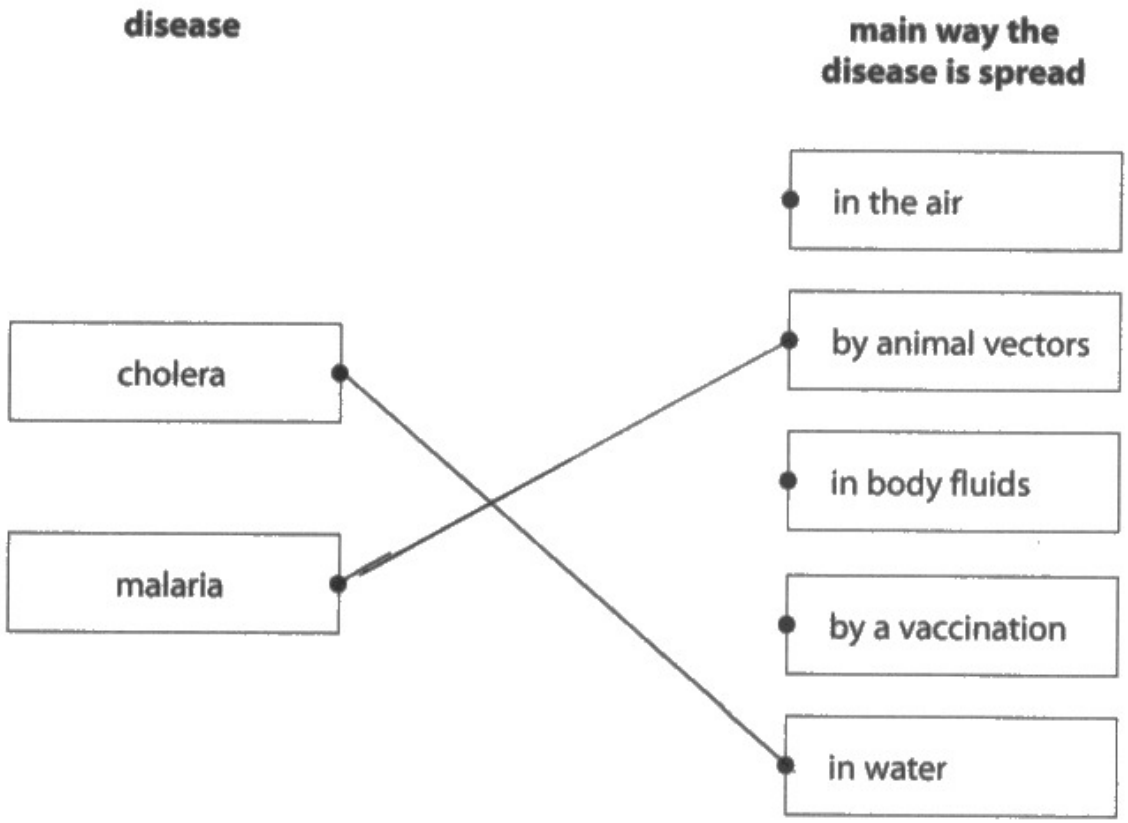
Question 1 (b)

This matching pairs question was about the main way that each of cholera and malaria are spread. The majority of candidates knew at least one of these.

Despite the advice given in previous reports, it should be noted that some candidates still do not follow the instruction to draw **one** straight line from each item on the left hand side.

(b) Draw **one** straight line from each disease to the main way that the disease is spread.

(2)

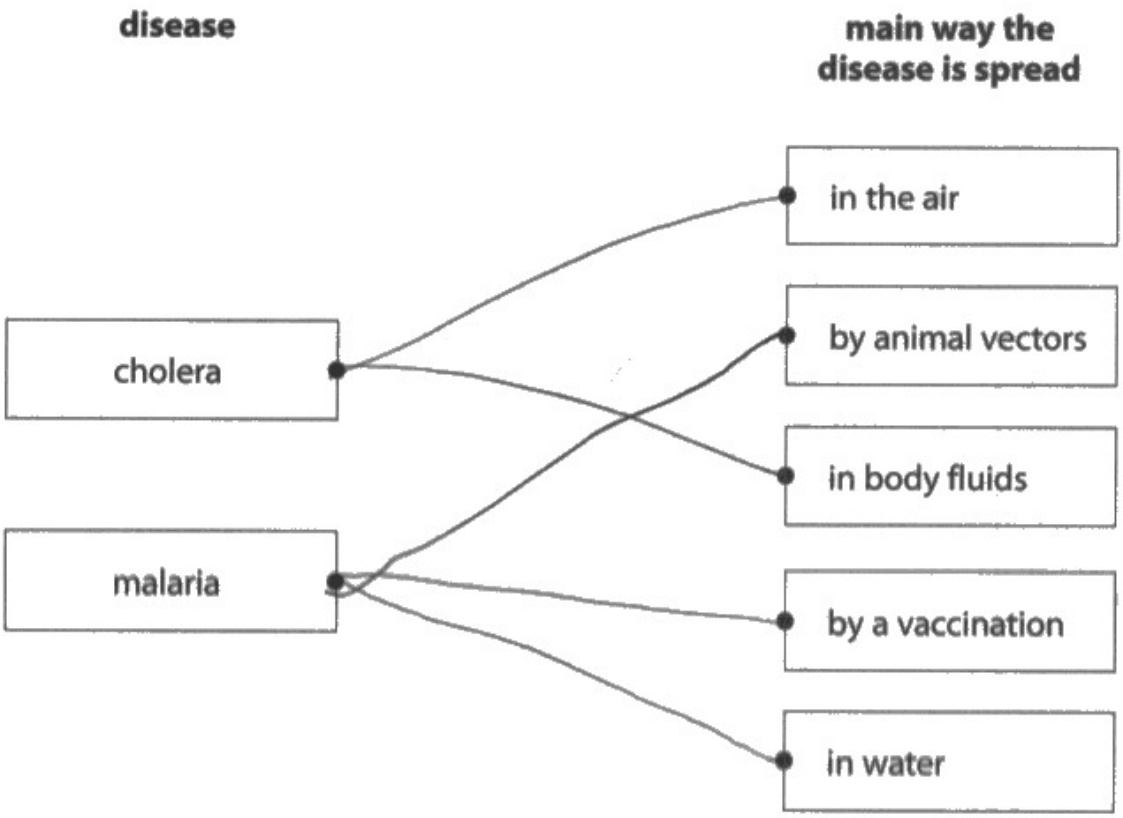


ResultsPlus
Examiner Comments

This response scores two marks for correctly matching cholera to spread in water and malaria to spread by animal vectors.

(b) Draw **one** straight line from each disease to the main way that the disease is spread.

(2)



ResultsPlus
Examiner Comments

This is not a creditworthy response. The candidate has drawn more than one line from each disease on the left hand side.

ResultsPlus
Examiner Tip

Always read the question and follow the instructions carefully. In this question you should only draw **one** straight line from each disease on the left hand side.

Question 1 (c)(i)

This question was about the effect of temperature on the growth of bacteria at two different temperatures.

Candidates were asked to plot three points on a graph. It is pleasing to note that the vast majority could do this accurately and scored the mark.

Question 1 (c)(ii)

This question was about the effect of temperature on the growth of bacteria at two different temperatures. Candidates were required to draw a line of best fit on the graph for 10^{o}C.

The majority of candidates could do this accurately enough to be credited with the mark, but they were generally less successful here than when plotting points. There were many instances of candidates drawing multiple, sketchy lines and lines of best fit that started at 0,0.

It was also noticeable that a large number of candidates did not have the use of a ruler in the examination.

(c) A scientist investigated the effect of temperature on the growth of bacteria.

The bacteria were grown at 10 °C and 20 °C.

The number of bacteria grown at each temperature were counted every two hours.

Figure 1 shows the result.

time in hours	number of bacteria at 10 °C in thousands	number of bacteria at 20 °C in thousands
0	10	10
2	20	47
4	30	74
6	40	80
8	50	80

Figure 1

Figure 2 shows a graph of the results at 20 °C.

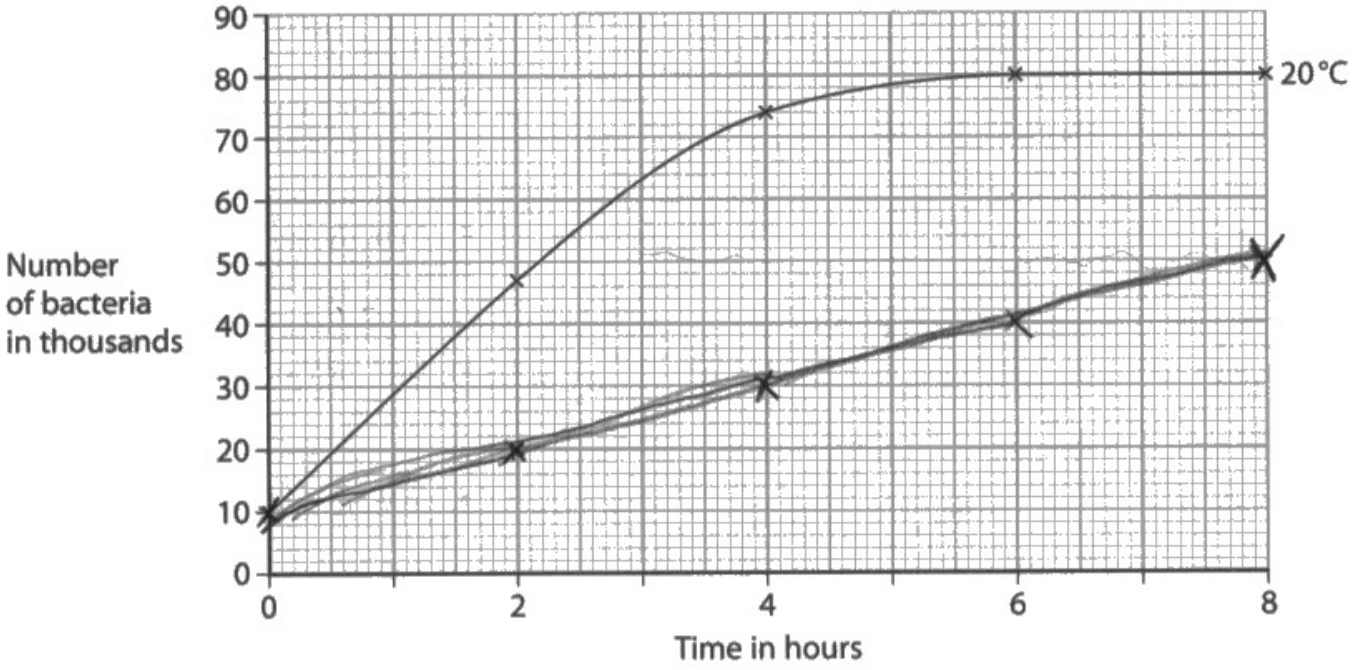


Figure 2

(i) Plot the points on the graph for the number of bacteria at 10 °C.

The first two points have been plotted for you.

(1)

(ii) Draw a line of best fit on the graph for 10 °C.

ResultsPlus
Examiner Comments

This is not a creditworthy answer. The candidate has not drawn a single straight line of best fit through all the plotted points and there are multiple sketchy lines between 0 and 4 hours.

ResultsPlus
Examiner Tip

Always bring a ruler with you to an examination. A straight line of best fit would have scored the mark here.

(c) A scientist investigated the effect of temperature on the growth of bacteria.

The bacteria were grown at 10 °C and 20 °C.

The number of bacteria grown at each temperature were counted every two hours.

Figure 1 shows the result.

time in hours	number of bacteria at 10 °C in thousands	number of bacteria at 20 °C in thousands
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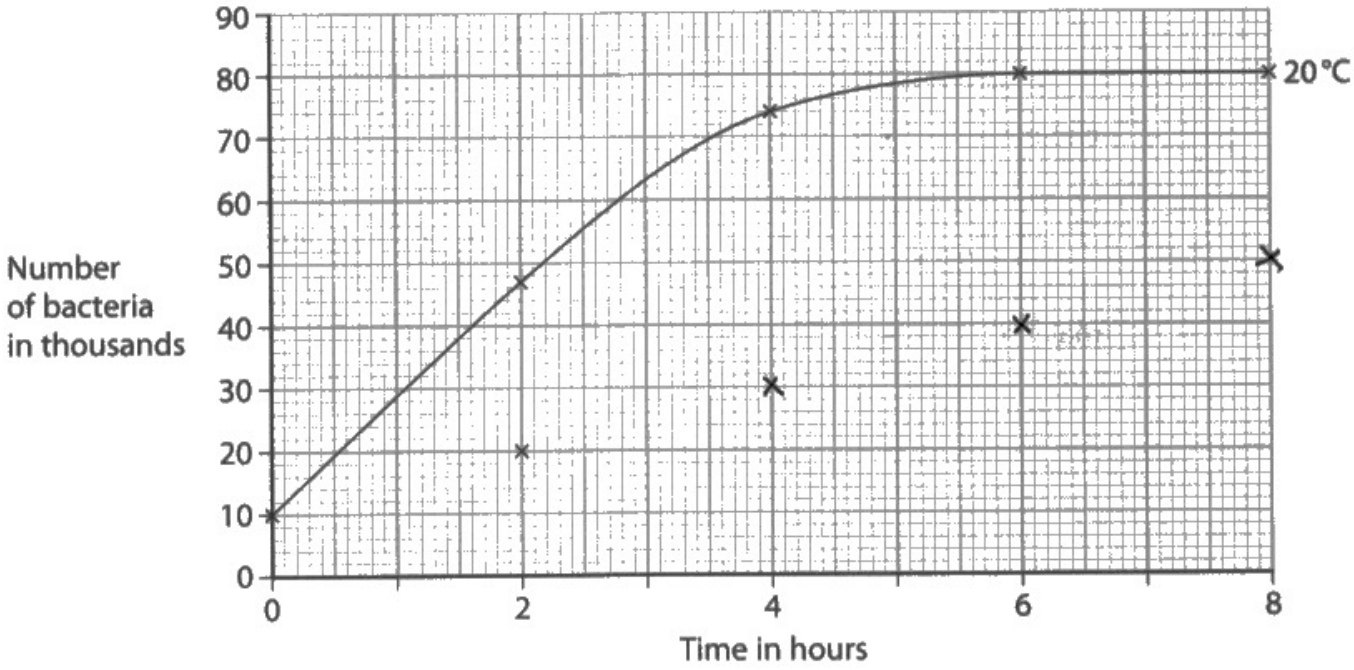

Figure 2

(i) Plot the points on the graph for the number of bacteria at 10 °C.

The first two points have been plotted for you.

(1)

(ii) Draw a line of best fit on the graph for 10 °C.

ResultsPlus
Examiner Comments

This response is not worth a mark.

The candidate has not followed the instruction to draw a line of best fit on the graph for 10^{o}C.

ResultsPlus
Examiner Tip

Read all the information in questions carefully in case you miss an instruction, such as drawing a line of best fit.

(c) A scientist investigated the effect of temperature on the growth of bacteria.

The bacteria were grown at 10 °C and 20 °C.

The number of bacteria grown at each temperature were counted every two hours.

Figure 1 shows the result.

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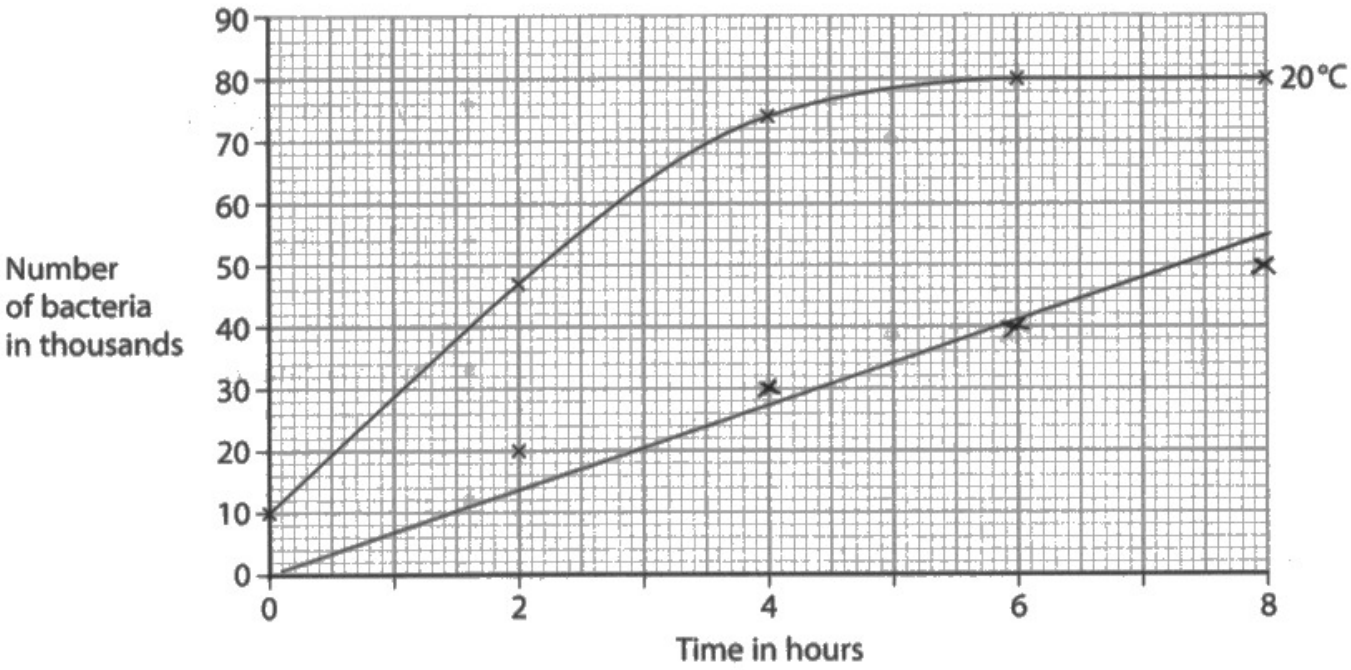

Figure 2

(i) Plot the points on the graph for the number of bacteria at 10 °C.

The first two points have been plotted for you.

(1)

(ii) Draw a line of best fit on the graph for 10 °C.

ResultsPlus
Examiner Comments

This is not a creditworthy response. The candidate has drawn a straight line using a ruler, but the line does not go through all the plotted points and therefore, does not score a mark.

Question 1 (c)(iii)

This question asked candidates to describe how the growth of bacteria at 10^{o}C was different to the growth of bacteria at 20^{o}C. The question was accessible, with the majority of candidates scoring a mark by stating that growth at 10^{o}C was slower (or lower) than the growth at 20^{o}C, although some candidates struggled to express their ideas clearly.

Many candidates could also describe the linear nature of the line at 10^{o}C, or the fact that the line at 20^{o}C does level off. There was little evidence of candidates using manipulated data to support their answers.

(iii) Describe how the growth of bacteria at 10 °C was different from the growth of bacteria at 20 °C.

(2)

The growth of bacteria at 10°C showed a gradual, but constant, increase in bacteria grown as from 0–8 hours the amount of bacteria grown is always increasing, whereas with number of bacteria grown at 20°C there is a constant increase (0–6) up until it hits 6 hours, and from there on the amount of bacteria grown plateus. Overall there is a greater amount of bacteria grown at 20°C.

(Total for Question 1 = 7 marks)

ResultsPlus
Examiner Comments

This response is worth two marks. Although not expressed very clearly, the candidate has conveyed two key points: the constant growth of bacteria at 10°C (and the fact that at 20°C the number of bacteria levels off) and the greater number of bacteria at 20°C.

ResultsPlus
Examiner Tip

Always think about what you are going to write and plan your answer to avoid writing below the lines. Ask for an additional sheet of paper if you need more answer space.

(iii) Describe how the growth of bacteria at 10 °C was different from the growth of bacteria at 20 °C.

(2)

the growth of bacteria at 20°C was a lot more than the growth at 10°C, at 20°C it also went up it totally random numbers, where as at 10°C it was going up in jumps of 10 thousand at a time the ~~optimum~~ 20°C hits its optimum amount of bateria, which is 80 thousand, after 6 hours at 20°C.

(Total for Question 1 = 7 marks)

ResultsPlus
Examiner Comments

This is a good response. The candidate recognises that there is more growth at 20^{o}C and that the number of bacteria at this temperature levels off from 6 hours. There is also an attempt to describe the pattern of growth at 10^{o}C.

Question 2 (a)(i)

This question was about how stone tools were made by our human ancestors. It was pleasing that the majority of candidates knew that making stone tools involved hitting them and many candidates could give the extra detail needed to score two marks, such as hit a stone with another stone.

2 Stone tools can be found at sites used by our human ancestors.

(a) Figure 3 shows tool P.

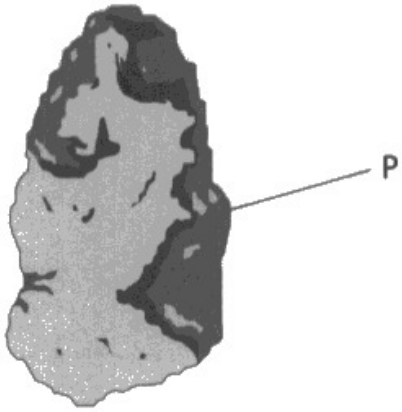

Figure 3

(i) Describe how tool P was made.

(2)

It was made by ~~hitting~~ bashing the tool on a harder rock which would chip away parts of the tool making it sharper.

ResultsPlus
Examiner Comments

This answer is worth two marks. The candidate has given a detailed description of how tool P was made; this response actually includes all three marking points but can only score a maximum of two.

2 Stone tools can be found at sites used by our human ancestors.

(a) Figure 3 shows tool P.

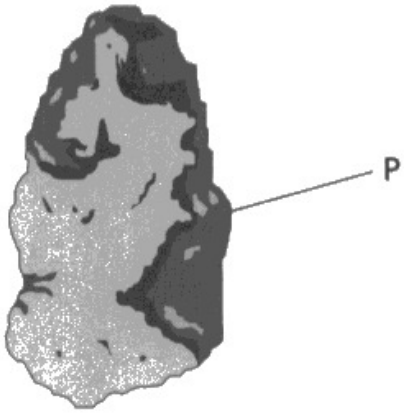

Figure 3

(i) Describe how tool P was made.

(2)

hit onto or by another rock until had the desired shape

ResultsPlus
Examiner Comments

This is a very concise answer which scores both marks.

2 Stone tools can be found at sites used by our human ancestors.

(a) Figure 3 shows tool P.

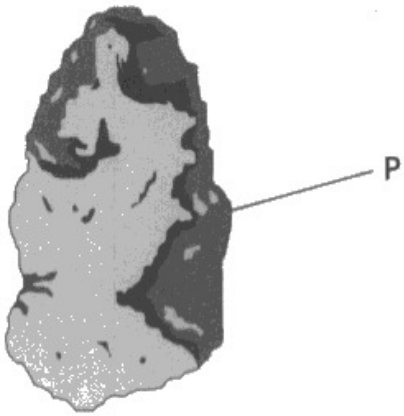

Figure 3

(i) Describe how tool P was made.

(2)

Tool P was made by someone hitting a rock against something else until it created a sort of point.

ResultsPlus
Examiner Comments

This answer is worth one mark. The candidate knows that tool P was made by hitting a rock, but 'against something else' is too vague. If the candidate had written 'hit a rock against another rock', then both marks could have been awarded.

Question 2 (a)(iii)

This question was about tools providing evidence for human evolution. Candidates were asked to complete two sentences using words from a box. An overwhelming majority of candidates completed both sentences correctly.

Question 2 (b)

This was a more challenging question about how stone tools and fossils can be dated to find out how old they are. Although many candidates attempted to answer the question, their responses were often rather vague and lacked the detail needed to score marks. That said, some candidates had very good knowledge and understanding of this topic, which they were able to include in their answers. One of the most common correct responses was linked to the depth that the tools or fossils were located in the ground. Only a small number of candidates referred to radiometric dating.

(b) Fossils were also found in the soil around tool Q.

Describe **two** ways that stone tools and fossils can be dated to find out how old they are.

(2)

1 Compare them to other tools and fossils found.

2 Measure how ~~far~~ deep in the ground they were found in comparison to others found.

ResultsPlus
Examiner Comments

This is a clear response that scores two marks. Comparing them to other tools and fossils gains the first marking point and measuring the depth of the tools and fossils is the second marking point.

(b) Fossils were also found in the soil around tool Q.

Describe **two** ways that stone tools and fossils can be dated to find out how old they are.

(2)

1 The Shape of the tool.

2 The Colour of the tools

ResultsPlus
Examiner Comments

This is not a creditworthy response. If the candidate had described comparing the shape of this tool to other tools, then a mark could have been awarded.

Looking at the colour of the stone tools and fossils is not a suitable way of finding out how old they are.

Question 3 (b)(i)

This question was about pentadactyl limbs. Candidates were asked to describe a difference between the humerus of the whale and of the human, using information from a diagram. The vast majority of candidates found this question very accessible and scored the mark.

Question 3 (b)(ii)

This question was about the phalanges of the horse and the phalanges of the human. The diagram key and shading was intended to make it easy to identify the phalanges, but many candidates interpreted them simply as fingers or a toe. The question was very challenging for the majority of candidates; straightforward answers involving counting the phalanges and making statements such as the horse has fewer phalanges were not very forthcoming; instead there were many incorrect comparisons of the number of fingers and toes.

(ii) Describe **one** difference between the phalanges of the horse and the phalanges of the human.

(1)

Humans have more phalanges than a horse

ResultsPlus
Examiner Comments

This straightforward response is worth a mark. There is no need for the candidate to add any extra detail to their answer.

(ii) Describe **one** difference between the phalanges of the horse and the phalanges of the human.

(1)

The horse has one single phalanges making a hoof whereas humans have 5 phalanges making a hand.

ResultsPlus
Examiner Comments

This response is not worth a mark. The candidate has not counted the individual phalanges; instead they have looked at the overall structure they are a part of, such as a hand.

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Examiner Tip

Always use the information provided. In this question you could use the key to identify the phalanges, then count them and compare the number in the horse and in the human.

(ii) Describe **one** difference between the phalanges of the horse and the phalanges of the human.

(1)

horse only has 1 whereas a human has 5.

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Examiner Comments

This response does not score a mark. The candidate has not counted the number of phalanges correctly; the horse has three and there are 14 in the human.

Question 3 (c)

This question was about the evolution of the beak of a bird. Photographs were provided to give visual clues and the majority of candidates attempted to answer the question at hand. Candidates who had learned this topic often listed the basic sequence of events that occur in scenarios such as this, or used acronyms, which helped them to structure their responses. However, it was disappointing to see very few candidates scoring more than two marks. In general, marks were awarded most frequently for describing the advantage of having a thinner beak and the fact that these birds were more likely to survive. Although reproduction was often referred to, there was little mention of the alleles for thinner beaks being passed on.

(c) Another chapter of the book discusses how the shape of bird beaks has evolved on different islands.

Figure 6 shows two species of finch from two different islands.

(Source: © Kristel Segeren/Shutterstock)

Species A

(Source: © Maurizio De Mattei/Shutterstock)

Species B

Figure 6

These two species of finch evolved from a common ancestor that had a similar shaped beak to species B.

Beak shape is related to the food that the finches eat.

Describe how the thinner beak of species A is a result of evolution.

(4)

Thse over millions of years finch There was a genetic mutation from the finch which led to them having longer beaks, because they had longer beaks they were able to reach food easiley and survive longer then other finches. So over ~~mai~~ millions of of years the gene of the longer beaks were passed on to create species A

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Examiner Comments

This well-structured answer is worth four marks. The candidate has described the evolution of the thinner beak very concisely, giving a clear sequence of the key features of the process.

(c) Another chapter of the book discusses how the shape of bird beaks has evolved on different islands.

Figure 6 shows two species of finch from two different islands.

(Source: © Kristel Segeren/Shutterstock)

Species A

(Source: © Maurizio De Mattei/Shutterstock)

Species B

Figure 6

These two species of finch evolved from a common ancestor that had a similar shaped beak to species B.

Beak shape is related to the food that the finches eat.

Describe how the thinner beak of species A is a result of evolution.

(4)

Species A have thinner beakers so they can fit into holes on trees to get food therefore they can survive longer since if there is no food on the ground they can reach food in trees whereas Species B would start of to die since their fins are short and it's harder for them to find food to eat

ResultsPlus
Examiner Comments

This response scores two marks. The candidate has described an advantage of having a thinner beak and how this benefits the survival of species A. The comparison with species B is useful but does not gain additional credit.

(c) Another chapter of the book discusses how the shape of bird beaks has evolved on different islands.

Figure 6 shows two species of finch from two different islands.

(Source: © Kristel Segeren/Shutterstock)

Species A

(Source: © Maurizio De Mattei/Shutterstock)

Species B

Figure 6

These two species of finch evolved from a common ancestor that had a similar shaped beak to species B.

Beak shape is related to the food that the finches eat.

Describe how the thinner beak of species A is a result of evolution.

(4)

Thinner beaks may have the advantage of getting into smaller areas, say where insects live. Birds with species B beak may live somewhere that relys on insect food. SAA If a bird has a natural mutation that makes its beak longer/ thinner it may get more food and survive better, thus able to breed so on and so forth.

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Examiner Comments

This concise response is worth three marks. The candidate has described an advantage of having a thinner beak; they go on to state that the thinner beak may be the result of a mutation and that this will increase the survival of species A because they can get more food.

Question 4 (b)(i)

This question asked candidates to calculate the difference in the risk of two people developing cirrhosis of the liver. Candidates had to take two readings from a graph before they could calculate this difference in risk. It was pleasing to see that the majority of candidates could answer this question successfully and score all three marks. Taking an incorrect reading from the graph was the most common reason for candidates not scoring full marks.

(i) Person A drinks alcohol on its own.

Person B drinks alcohol with their meals.

Calculate the difference in risk for these two people when each one drinks 28 units of alcohol per week.

(3)

A = 28 units = 1.8

B = 28 units = 3

3 - 1.8 = 1.2

1.2

ResultsPlus
Examiner Comments

This answer scores all three marks. The candidate has read the two values from the graph correctly and has calculated the difference in risk correctly.

(i) Person A drinks alcohol on its own.

Person B drinks alcohol with their meals.

Calculate the difference in risk for these two people when each one drinks 28 units of alcohol per week.

(3)

B = 1.7 3 - 1.7 = 1.3
A = 3

1.3

.....

ResultsPlus
Examiner Comments

This response scores two marks. The reading taken from the graph for person B is incorrect. However, this single error can be carried forward and the candidate gains credit for calculating the difference in risk between person A and person B.

ResultsPlus
Examiner Tip

Always double check the readings you take from graphs. It is often a good idea to use a ruler as a guide so that you read from the correct place on the axes.

(i) Person A drinks alcohol on its own.

Person B drinks alcohol with their meals.

Calculate the difference in risk for these two people when each one drinks 28 units of alcohol per week.

(3)

3 - 1·8 = 2·2

2·2

ResultsPlus
Examiner Comments

This answer is worth two marks. The readings taken from the graph are correct, but the candidate has made an error when calculating the difference in risk.

ResultsPlus
Examiner Tip

Always go back and check your calculations.

Question 4 (b)(ii)

This question was answered very successfully. Candidates were asked to give two pieces of health advice for people about drinking alcohol, based on evidence on the relative risk of developing cirrhosis of the liver. Many candidates showed good knowledge of the topic and the majority of them were able to interpret the evidence well enough to score both of the marks available. It was also pleasing to note the number of concise responses to this question.

(ii) Using evidence from Figure 7, state **two** pieces of health advice for people about drinking alcohol.

(2)

1 If you are going to drink alcohol, drink it with meals.

2 Consume as few units per week as possible.

ResultsPlus
Examiner Comments

This response is worth two marks. The candidate's answer is concise and to the point; they have given two relevant pieces of health advice.

(ii) Using evidence from Figure 7, state **two** pieces of health advice for people about drinking alcohol.

(2)

1 drink alcohol with a meal

2 ~~Do~~ don't ~~consume~~ consume more than 4 units per week.

ResultsPlus
Examiner Comments

This answer scores two marks. The candidate has looked carefully at the evidence and has quoted what they consider to be a maximum number of units of alcohol to consume per week, based on relative risk.

Question 4 (c)(i)

This question asked candidates to state where genes are found in cells.

It was pleasing to see that the majority of candidates could give a correct response, such as in the nucleus or on a chromosome.

Question 4 (c)(ii)

Most candidates found this question very challenging. The question involved interpreting a family pedigree showing the inheritance of cystic fibrosis and explaining a statement about the genotype of an individual in the family. In many cases, the ability to express ideas using appropriate biological terms let candidates down. The answers expected centred around the reason why the person must have a dominant allele (because they do not have cystic fibrosis) and why they must have a recessive allele (because a daughter with cystic fibrosis must have inherited this allele from her).

(ii) Figure 8 shows the inheritance of cystic fibrosis in a family.

F represents the dominant allele that does not cause cystic fibrosis.

f represents the recessive allele that causes cystic fibrosis.

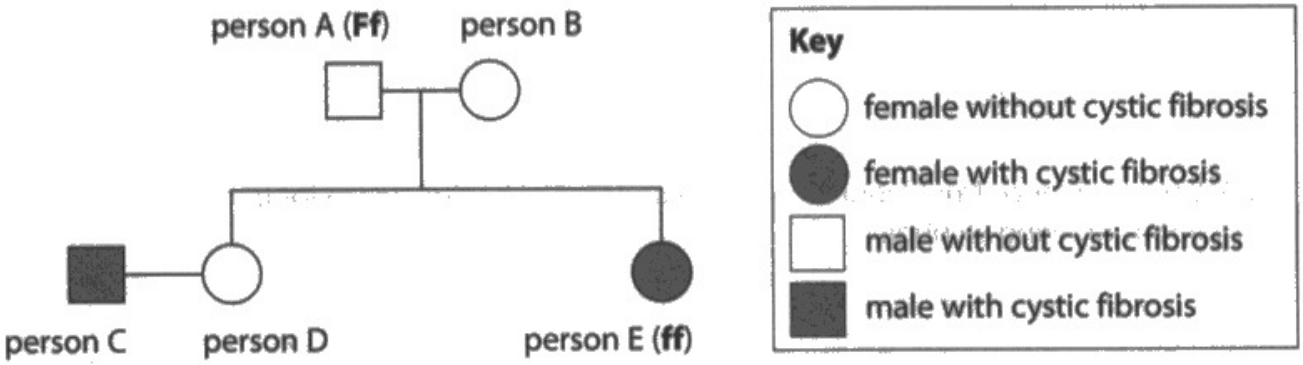

Figure 8

A scientist states that the genotype of person B is **Ff**.

Explain why the scientist is correct.

(2)

person a has the recesive allele so it needs another recessive f and the person E has cystic fibrosis so person the B must have the recessive allele

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Examiner Comments

This answer is worth one mark. The candidate has explained why person B must have a recessive allele, but there is no mention of the dominant allele.

ResultsPlus
Examiner Tip

Always remember to use correct biological terms, such as allele, in genetics questions.

(ii) Figure 8 shows the inheritance of cystic fibrosis in a family.

F represents the dominant allele that does not cause cystic fibrosis.

f represents the recessive allele that causes cystic fibrosis.

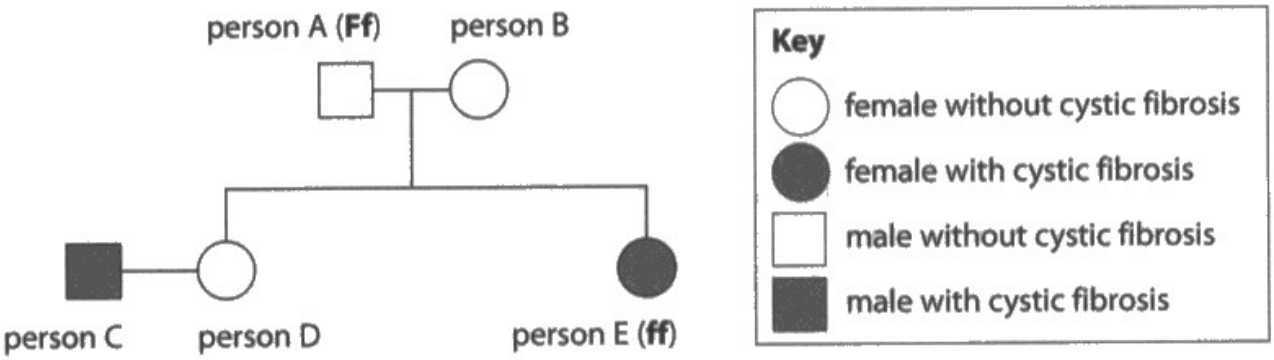

Figure 8

A scientist states that the genotype of person B is **Ff**.

Explain why the scientist is correct.

(2)

Person B must have the recessive allele to pass it onto person E with person A. However, they must also have the dominant allele to not have cystic fibrosis themself.

ResultsPlus
Examiner Comments

This answer scores two marks. There is a clear explanation of why the genotype of person B must have a dominant allele and a recessive allele.

(ii) Figure 8 shows the inheritance of cystic fibrosis in a family.

F represents the dominant allele that does not cause cystic fibrosis.

f represents the recessive allele that causes cystic fibrosis.

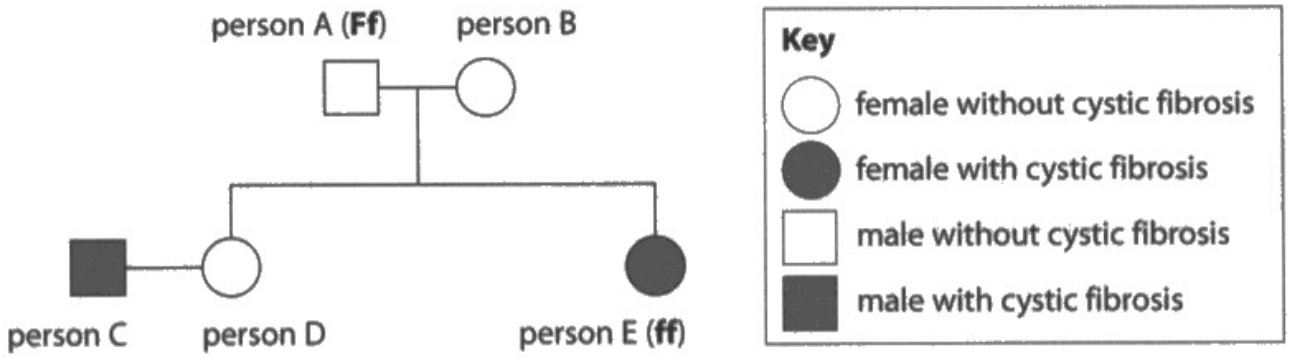

Figure 8

A scientist states that the genotype of person B is **Ff**.

Explain why the scientist is correct.

(2)

Because the dominant allele that doesn't cause cystic fibrosis is F, h and this person doesn't have cystic fibrosis, therefore meaning their genotype is Ff.

ResultsPlus
Examiner Comments

This response is worth one mark. Although not particularly clear, there is an explanation of why person B must have a dominant allele for cystic fibrosis.

ResultsPlus
Examiner Tip

Always try to set explanations out clearly and remember to use biological terms when you can.

Question 4 (c)(iii)

This question asked candidates to state the genotype of a person in a family pedigree.

It was surprising to note that many candidates were clearly not conversant with the term genotype, even though it was used in the stem of the question.

In some cases it was difficult to determine if the letters written were capital or lower case letters, so candidates are encouraged to always make very this clear in their answers.

Question 5 (a)

This question asked candidates to state one advantage of asexual reproduction for a plant. The most common response seen was that there is no need for a mate or partner.

Although a large proportion of candidates attempted to answer the question, many could not come up with a creditworthy response.

Question 5 (b)(i)

In this question, candidates had to interpret data in a table to describe the effect of temperature on the number of plantlets produced by a plant. A photograph of the plant gave candidates the visual clue needed if they were unfamiliar with plantlets.

This was an accessible question and a large proportion of candidates gained at least some credit for their answers.

(i) Describe the effect of temperature on the number of plantlets produced by these plants.

(2)

when the temperature is 20°C the most number of plantlets are produced. plantlets stop being produced at 30°C. 20°C is the perfect temperature to grow plantlets on.

ResultsPlus
Examiner Comments

This answer is worth two marks. The candidate has scored the marks for describing that 20°C is the perfect temperature to grow plantlets and that there are no plantlets at 30°C.

ResultsPlus
Examiner Tip

When you use data to describe the effect of one variable on another, make sure that you make clear statements and describe any patterns that you can see.

(i) Describe the effect of temperature on the number of plantlets produced by these plants.

(2)

20°C is the optimum temperature to produce at as it was the highest number (12). At anything bellow 10°c and above 30°c it was denaturing.

ResultsPlus Examiner Comments

This answer is worth one mark. Although not expressed particularly well, the candidate has described that 20°C is the best temperature to produce plantlets. The reference to denaturing is not relevant; if the candidate had stated that no plantlets are produced below 10°C or at 30°C, then a second mark could be awarded.

(i) Describe the effect of temperature on the number of plantlets produced by these plants.

(2)

The plants need to be in the right temperature threshold (15°c - 25°c) to produce effectively

ResultsPlus Examiner Comments

There is one creditworthy point in this response. The candidate has specified the temperature range in which plantlets are produced. A comment about how the number of plantlets increases from 15°C to 20°C, or decreases above 20°C, would score a second mark.

Question 5 (c)

This was a challenging item for a large number of candidates; they did not find it easy to explain one advantage of sexual reproduction. One of the most common correct responses was linked to greater variation, but few candidates could explain an advantage of this, such as an organism being able to exploit a change in its environment.

(c) The plant in Figure 9 also produces flowers for sexual reproduction.

Explain **one** advantage of sexual reproduction.

(2)

they can produce variation in plants such as different shapes and colours.

ResultsPlus
Examiner Comments

This answer is worth one mark. The candidate has scored the second marking point by referring to variation. If they had gone on to explain how variation is beneficial to organisms, then the response would score full marks.

ResultsPlus
Examiner Tip

Remember that in questions that use the command word 'explain', you must give a reason for a particular situation; in this question you need to give a reason why inheriting different alleles or showing variation, gives organisms an advantage.

(c) The plant in Figure 9 also produces flowers for sexual reproduction.

Explain **one** advantage of sexual reproduction.

(2)

Sexual reproduction creates variation and variation means that if condictions change, such as a disease not all of the plants will be affected so the plant species can survive.

ResultsPlus
Examiner Comments

This is a good answer that scores two marks. The candidate appreciates that sexual reproduction results in variation and they have given an example of how this can be beneficial to organisms.

Question 5 (d)

This was a question about selective breeding. Questions on this topic often result in some very confused responses, but it is pleasing to report that candidates found this particular question very accessible and the vast majority scored at least one mark. Some well-structured responses were seen, probably helped by the way in which the key information was presented to them in a tabular format.

(d) Figure 11 shows the characteristics of three different varieties of this plant.

characteristic	plant K	plant L	plant M
size of leaves	small	large	small
striped leaves	none	none	green and white
flowers	small white	large white	large pink

Figure 11

A gardener wants to use selective breeding to produce a plant with large green and white striped leaves and large white flowers.

Explain which plants the gardener should use.

(3)

The gardener should use plant L and plant M to get his desired outcome

ResultsPlus
Examiner Comments

This answer is worth one mark. The candidate has correctly determined that the gardener should use plants L and M, but they have not given a reason why these two plants should be used.

ResultsPlus
Examiner Tip

To score full marks for this question, you need to explain the reason for choosing plant L and plant M.

(d) Figure 11 shows the characteristics of three different varieties of this plant.

characteristic	plant K	plant L	plant M
size of leaves	small	large	small
striped leaves	none	none	green and white
flowers	small white	large white	large pink

Figure 11

A gardener wants to use selective breeding to produce a plant with large green and white striped leaves and large white flowers.

Explain which plants the gardener should use.

(3)

The gardener should use plant L and plant M because plant L has large leaves and large white flowers and plant M has green and white striped leaves.

ResultsPlus
Examiner Comments

This is a very concise answer that scores three marks. The correct two plants have been chosen and the reason for doing so has been explained.

ResultsPlus
Examiner Tip

Well-structured answers do not need to use all the available answer space.

Question 6 (a)(ii)

This question was about how percentile charts are used. Very few candidates could give a clear, unambiguous response.

Straightforward answers such as to monitor growth were enough to score the mark.

A large number of responses incorrectly referred to how a percentile range could be determined using age and height.

(ii) State how percentile charts are used.

(1)

are used to monitor growth through time

ResultsPlus
Examiner Comments

This response scores a mark. The candidate has given a correct use of percentile charts.

(ii) State how percentile charts are used.

(1)

Start with the age and go up to what hight they are, look on or inbetween the lines.

ResultsPlus
Examiner Comments

This is not a creditworthy response. The candidate has described how to find the percentile range for an individual, which is not relevant.

(ii) State how percentile charts are used.

(1)

They are used to make sure a child is developing ~~proba~~ properly.

ResultsPlus
Examiner Comments

This answer is worth a mark. The reference to 'developing properly' was accepted as an alternative for monitoring growth.

Question 6 (b)(i)

This question provided candidates with a diagram of a sperm cell. They were required to describe two ways that the sperm cell is specialised.

(b) As we grow, we make new cells by mitosis and meiosis.

(i) The cells that are made can become specialised.

Figure 13 shows a diagram of a sperm cell.

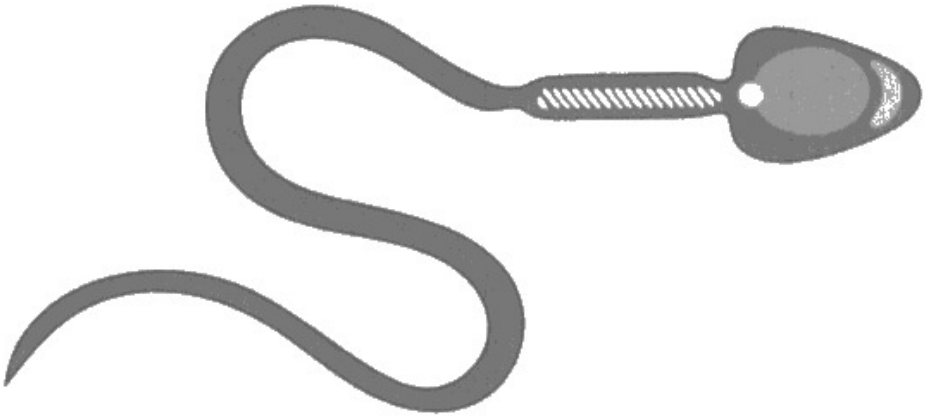

Figure 13

Describe **two** ways that the sperm cell is specialised.

(2)

1 Acrosome to get through the egg

2 Mitochondria in the middle part to ~~make~~ have the energy to travel

ResultsPlus
Examiner Comments

This is a good answer worth two marks. However, the candidate has given some additional, unnecessary explanatory information about each specialisation.

ResultsPlus
Examiner Tip

Remember that if the command word of the question is 'describe', there is no need to give additional explanatory information. You will not be awarded marks for the extra detail.

(b) As we grow, we make new cells by mitosis and meiosis.

(i) The cells that are made can become specialised.

Figure 13 shows a diagram of a sperm cell.

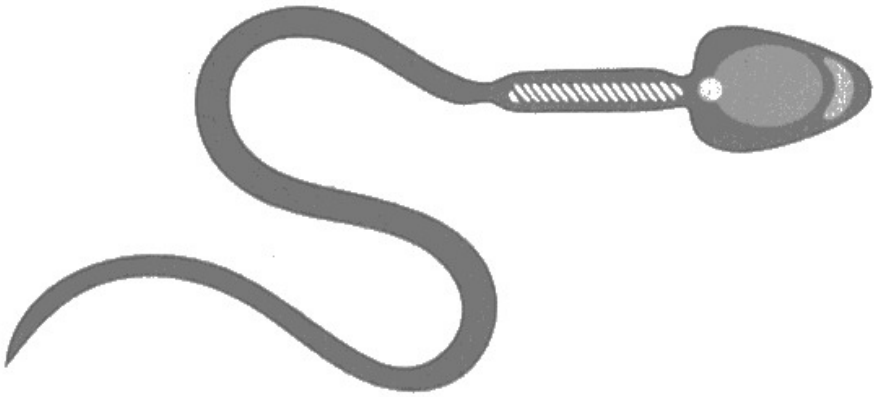

Figure 13

Describe **two** ways that the sperm cell is specialised.

(2)

1 it has a flagellum which helps it swim towards the egg for fertilisation.

2 it has an acrosome.

ResultsPlus
Examiner Comments

This response is worth two marks. Flagellum and acrosome are both creditworthy points. There was no need to describe the function of the flagellum.

Question 6 (b)(ii)

This question was about mitosis and meiosis. Using information about the number of chromosomes in human cells, candidates were required to complete a table, by giving the number of daughter cells produced by mitosis and by meiosis; the number of chromosomes in each daughter cell was also required.

The question was attempted by most candidates, but it was apparent that there was much confusion about the two types of cell division and their outcomes.

(ii) Complete the table to show the results when a cell divides by mitosis or meiosis in humans.

Human body cells, except gametes, have 23 pairs of chromosomes.

(4)

	mitosis	meiosis
number of daughter cells produced	2	4
number of chromosomes in each daughter cell	46	23

ResultsPlus
Examiner Comments

This response scores four marks. The candidate has completed all the boxes in the table correctly.

(ii) Complete the table to show the results when a cell divides by mitosis or meiosis in humans.

Human body cells, except gametes, have 23 pairs of chromosomes.

(4)

	mitosis	meiosis
number of daughter cells produced	~~46~~ 23	46
number of chromosomes in each daughter cell	46	92

ResultsPlus
Examiner Comments

This response is worth one mark.

The only box completed correctly, is the number of chromosomes in each daughter cell when a cell divides by mitosis (46).

The first row of the table indicates that the candidate is confused by the number of daughter cells produced and the number of chromosomes in daughter cells.

ResultsPlus
Examiner Tip

When you revise cell division, check that you know:

- how meiosis and mitosis affect the number of daughter cells produced.
- how meiosis and mitosis affect the number of chromosomes in each daughter cell.

(ii) Complete the table to show the results when a cell divides by mitosis or meiosis in humans.

Human body cells, except gametes, have 23 pairs of chromosomes.

(4)

	mitosis	meiosis
number of daughter cells produced	2	4
number of chromosomes in each daughter cell	~~23~~ 48	23

ResultsPlus
Examiner Comments

This answer scores three marks.

The candidate has made an error recording the number of chromosomes in each daughter cell produced by mitosis.

ResultsPlus
Examiner Tip

Always check your answers, just in case you have made a mistake.

Question 6 (c)(ii)

This question was based on a practical scenario. Candidates were told that plant root cells contain an enzyme that joins glucose molecules together. They were asked to devise a plan to investigate the effect of pH on the activity of this enzyme.

Previous examination series have highlighted a relatively poor performance on this type of question and this was no exception, even though a core practical in topic 1 is on this theme. One of the main issues for candidates seemed to be the confusion with the popular investigation that involves the breakdown of starch.

Whilst many candidates attempted to tackle the question at hand, approximately half of them were unable to make any creditworthy comments.

Very few candidates wrote logical answers in sufficient detail to gain all three marks. A mark was awarded most frequently for either testing for starch (using iodine solution) or for repeating at more than one pH.

(ii) Plant root cells contain an enzyme that joins glucose molecules together to make starch.

Devise a plan to investigate the effect of pH on the activity of this enzyme.

(3)

Make a solution containing plant root cells and glucose. Add substances ~~with~~ from pH 1 all the way up to pH 14. Test how much starch is present using iodine, if present will turn blue-black. At some pH starch will not be made. Keep ~~room~~ temperature of reactions all the same.

ResultsPlus
Examiner Comments

This is a well-structured answer worth three marks. The candidate has actually included four creditworthy points in their response: mixing plant root cells (containing the enzyme) with glucose (solution); testing for starch; varying pH and keeping the temperature constant.

ResultsPlus
Examiner Tip

If you are asked to devise a plan, always use the information provided in the question and write a series of simple, logical steps.

(ii) Plant root cells contain an enzyme that joins glucose molecules together to make starch.

Devise a plan to investigate the effect of pH on the activity of this enzyme.

(3)

You could use a solution of the enzyme. Place a couple drops of iodine in some wells of a spotting tile and then mix the enzyme into a your desired pH with the glucose solution. Once this is done mix them together with a stirring rod. each You then place a couple drops of the solution into a spotting tile and time how long it takes for the iodine to turn blue black from brown. Then repeat the test at different pH.

ResultsPlus
Examiner Comments

This is a well-structured response that scores three marks. The candidate has understood the task and there is evidence that they have applied their knowledge and experience of another practical task.

ResultsPlus
Examiner Tip

Always begin your answer on the first answer line, then you won't have to write below the lines at the end.

(ii) Plant root cells contain an enzyme that joins glucose molecules together to make starch.

Potato iodine

Devise a plan to investigate the effect of pH on the activity of this enzyme.

(3)

the ph shouldnt be too acidic or too alkaline and should be at a neutral around 7. to check for starch there is the iodine test. you can also test the pH on pH strips to ensure it is at a good pH for starch to occur.

ResultsPlus
Examiner Comments

This response is worth one mark, for using the iodine test to check for starch. The candidate has referred to pH, but they have not made it clear that a range of pH values should be used.

ResultsPlus
Examiner Tip

Always check the total number of marks available for a question and try to include an appropriate number of points in your answer to score those marks.

(ii) Plant root cells contain an enzyme that joins glucose molecules together to make starch.

Devise a plan to investigate the effect of pH on the activity of this enzyme.

(3)

I put plant root cells in test tubes which contain ✓ pHs & varying levels, leave it for 30 minutes then look at the results.

ResultsPlus
Examiner Comments

This response scores one mark for the use of a range of pH values. There are no other creditworthy points; they have referred to putting plant root cells in test tubes, but glucose solution needs to be added too.

(ii) Plant root cells contain an enzyme that joins glucose molecules together to make starch.

Devise a plan to investigate the effect of pH on the activity of this enzyme.

(3)

- Get Multiple test ~~tubes~~ tubes and fill them with a different pH 1-7 or 7-14.
- get some root beans and place them into a dish.
- ~~test with~~ a different sample of cells pH with each pH and record the amount of starch present, by using iodine.

ResultsPlus
Examiner Comments

This response scores two marks. The candidate has given a clear indication that a range of pH values should be used and they are aware that the presence of starch needs to be tested for.

ResultsPlus
Examiner Tip

Always check the total number of marks available for a question and try to include an appropriate number of points in your answer to score those marks.

Question 7 (a)(ii)

This question was about using surgery to correct cataracts. The question was attempted by most candidates, but a lack of knowledge of eye structure and eye defects let many candidates down; those who did not appreciate that cataracts affect the lens wrote some rather confused responses.

(ii) Describe how cataracts are corrected by surgery.

(2)

cataracts can be corrected by taking out the lens of the eye and replace it with a plastic one.

ResultsPlus
Examiner Comments

This response is worth two marks. The candidate has scored the second and third marking points for 'taking out the lens' and 'replace it with a plastic one'.

(ii) Describe how cataracts are corrected by surgery.

(2)

Cataracts are corrected by surgery, in the fact that they cut into the eye remove the build up of protein and fibres.

ResultsPlus
Examiner Comments

This answer scores one mark. The candidate knows that cataracts are caused by a build-up of protein, but they have not linked this to the lens and the fact that the opaque lens needs to be replaced. However, cutting into the eye scores a mark.

ResultsPlus
Examiner Tip

Remember that there is no need to repeat the question in your answer.

(ii) Describe how cataracts are corrected by surgery.

(2)

Lazer eye surgery can be used and it consists of cutting through the first layer of the eye and removing it to fix the catarcats

ResultsPlus Examiner Comments

This answer is worth one mark. The candidate has scored the first marking point for the reference to using a laser to cut into the eye.

They have not gone on to describe what needs to be removed or replaced.

(ii) Describe how cataracts are corrected by surgery.

(2)

Cataracts are caused by a build up as Proteins in the lens. This is corrected by replacing the lens with a plastic lens.

ResultsPlus Examiner Comments

This concise answer scores two marks. The candidate has stated the cause of cataracts, which is not necessary here, but they have described how to correct the problem.

Question 7 (b)(i)

This question asked candidates to explain how the size of the pupil of the eye changes when a torch is shone into the eye of a person.

A large proportion of candidates knew that the pupil would get smaller and scored a mark for this. However, relatively few candidates could explain how the pupil would become smaller. Many candidates also stated what would happen to the size of the pupil in the dark.

(b) (i) Explain how the size of the pupil of the eye changes when a torch is shone into the eye of a person.

(3)

In the dark, the pupil increases so it can pick up more light so we can see more & more clear. so when a sudden beam of light is shone into your pupil the pupil will quickly decrease in size so that the light doesn't damage the eye.

ResultsPlus
Examiner Comments

This response is worth one mark. The candidate has stated what will happen to the size of the pupil in the dark, then goes on to say what will happen to the size of the pupil when a beam of light is shone into it, which scores the mark. The candidate has not explained how the pupil changes size, so no further credit can be given.

ResultsPlus
Examiner Tip

In questions with the command word 'explain', always remember to give a reason why something happens. In this case, explain how the pupil changes size.

(b) (i) Explain how the size of the pupil of the eye changes when a torch is shone into the eye of a person.

(3)

The iris contains muscles that contract and relax when light is shone into the pupil. The muscles contract when light is shone into the pupil, making the pupil smaller. When there is no light shining in the pupil, the muscles in the iris relax, making the pupil bigger. When there is low levels of light, the pupil gets bigger.

ResultsPlus
Examiner Comments

This detailed response scores three marks. The candidates realises that the pupil will become smaller and that this is a result of muscles in the iris contracting. Instead of referring to muscles contracting, the candidate could have simply explained that the iris gets bigger.

Question 7 (b)(ii)

In this extended open-response question, candidates were provided with a diagram showing light rays entering the eye of someone who cannot see distant objects clearly. The diagram was provided to make the question more accessible.

Candidates were asked to explain why this person cannot see distant objects clearly and how the problem can be corrected.

Many candidates struggled to get to grips with eye structure and function and eye defects. The diagram helped the majority of candidates to make an attempt to answer the question and a basic answer such as 'wear glasses' was sufficient to gain a mark in level 1. More specific details of the problem itself (short-sightedness) and how to correct it, were required to gain marks in levels 2 and 3.

*(ii) Figure 15 shows a diagram of light entering an eye of someone who cannot see distant objects clearly.

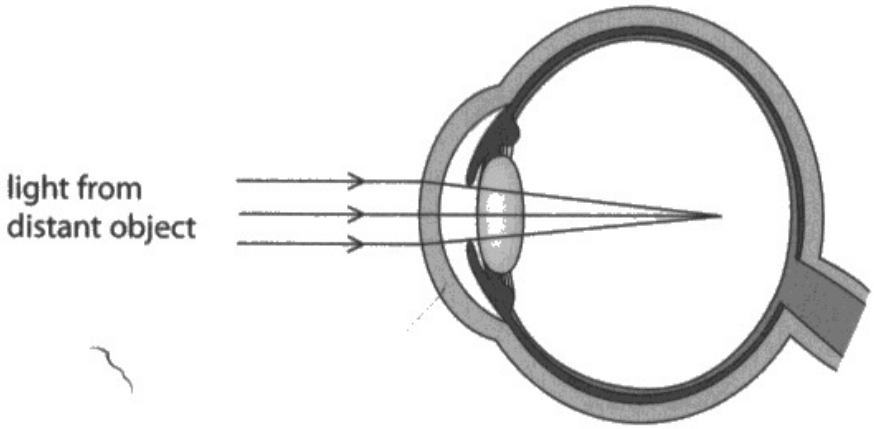

Figure 15

Explain why this person cannot see distant objects clearly and how the problem can be corrected.

(6)

They cant see distant objects because the light isnt reaching to the back of the eye stopping long distance vision.

ResultsPlus
Examiner Comments

This is a level 1 response. The candidate has noticed that light rays do not meet on the retina (back of the eye was accepted at this level) and this is the reason why the person cannot see distant objects clearly.

ResultsPlus
Examiner Tip

In extended open-response questions always check that you have answered all aspects of the question. In this example you could write about how the eye problem can be corrected.

*(ii) Figure 15 shows a diagram of light entering an eye of someone who cannot see distant objects clearly.

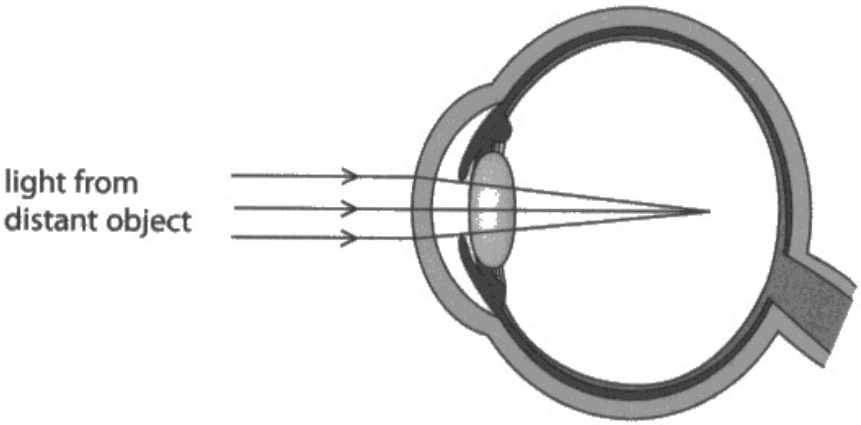

Figure 15

Explain why this person cannot see distant objects clearly and how the problem can be corrected.

(6)

This person has short-sightedness, when the light rays are refracted too much and focused before the focal point in retina. This condition is caused either by too curved cornea, too convex lens or too long eye ball. The distant objects to look blury. To correct the ~~b~~ problem diverging (concave) lenses could be used to diverge the light rays and focus them to the focal point (fovea) in retina.

ResultsPlus
Examiner Comments

This is an excellent response that scores a mark at the top of level 3. The candidate has written a logical explanation of the eye problem and how it can be corrected. Biological terms have been used correctly throughout the answer.

ResultsPlus
Examiner Tip

Always remember to use biological terms when you have to give an explanation.

*(ii) Figure 15 shows a diagram of light entering an eye of someone who cannot see distant objects clearly.

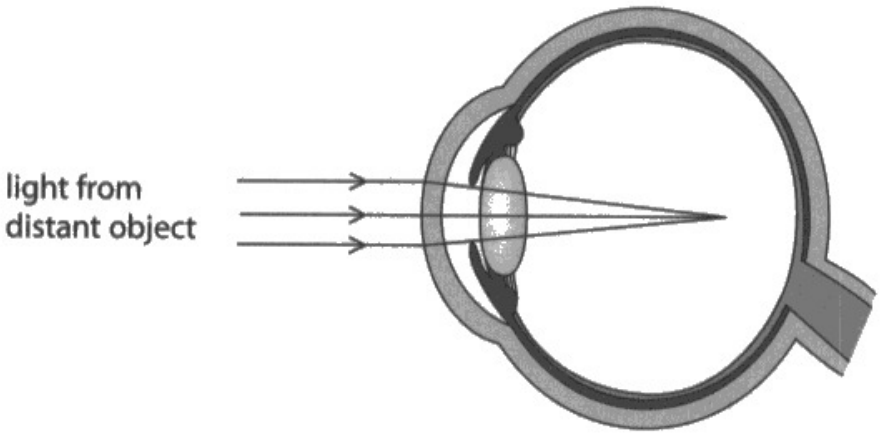

Figure 15

Explain why this person cannot see distant objects clearly and how the problem can be corrected.

(6)

The problem can be corrected ~~[illegible]~~ with surgery ~~[illegible]~~ or by giving the person glasses. This will allow the person to put a lens in ~~[illegible]~~ front of there eye allowing them to be able to see ~~again~~ distant objects.

ResultsPlus
Examiner Comments

This is a level 1 response. The candidate has made simple comments about how the eye problem can be corrected: surgery or wearing glasses. If the candidate had provided additional detail about the lenses in the glasses (diverging) and what they do, or the type of surgery (laser surgery of the cornea) then this could be a level 2 answer.

ResultsPlus
Examiner Tip

Always remember to answer all parts of the question. Underlining key words can be a useful reminder.

*(ii) Figure 15 shows a diagram of light entering an eye of someone who cannot see distant objects clearly.

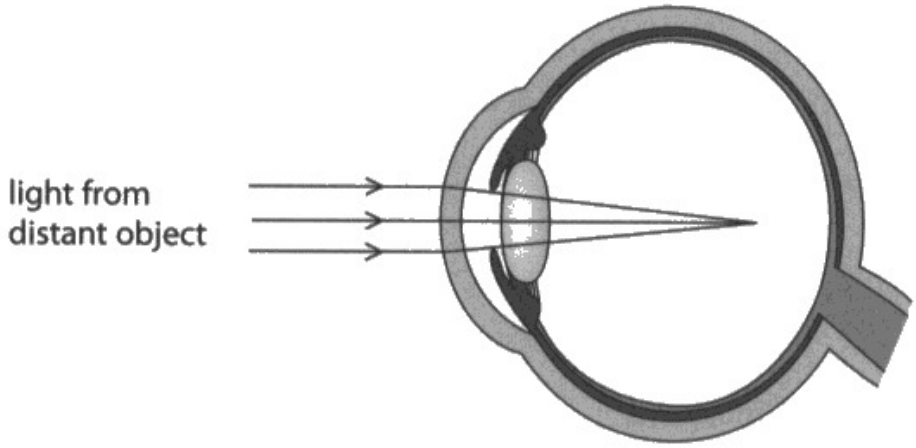

Figure 15

Explain why this person cannot see distant objects clearly and how the problem can be corrected.

(6)

- The person cannot see correctly as the light from a distant object doesn't reach the back of their eye.
- This is because of ~~a~~ the eye being too ~~wide~~ long.
- ~~The light doesn't ser~~

- This can be fixed using the lenses of glasses.
- The lenses magnify the light making it reach the back of the eye, sending a signal to the brain so the person can see correctly

ResultsPlus
Examiner Comments

This response scores a mark in level 2. The candidate has given a straightforward explanation of the eyesight problem, which is a good level 1 answer. They have also suggested that glasses or lenses can be used to correct the problem, so this moves the response into level 2. However, there are no references to what type of lens or what the lens should do, so a mark at the bottom of level 2 is appropriate.

Question 8 (a)

This question asked candidates to describe how base pairs are bonded together in a DNA molecule.

In general, most candidates attempted to answer the question, but it was surprising to find that a large proportion of them could not recall relevant information in their responses.

8 (a) DNA molecules contain base pairs.

Describe how the base pairs are bonded together in a DNA molecule.

(2)

They ~~are to~~ have a hydrogen bond linking them together.

ResultsPlus
Examiner Comments

This answer is worth one mark for hydrogen bonds.

ResultsPlus
Examiner Tip

To score full marks on a question, always check the question total and write an appropriate number of points.

8 (a) DNA molecules contain base pairs.

Describe how the base pairs are bonded together in a DNA molecule.

(2)

C+G are ~~attage~~ together and T+A are together. All four together make a DNA strands.

ResultsPlus
Examiner Comments

This response scores one mark for correctly describing how the bases pair up (C with G and A with T). Giving just one of these pairings would still score the mark.

8 (a) DNA molecules contain base pairs.

Describe how the base pairs are bonded together in a DNA molecule.

(2)

the DNA structure is a Double helix bond?

ResultsPlus
Examiner Comments

This is not a creditworthy response. Double helix is the shape of a DNA molecule, not how base pairs are bonded together in a DNA molecule.

8 (a) DNA molecules contain base pairs.

Describe how the base pairs are bonded together in a DNA molecule.

(2)

The base pairs A and T are bonded togemer by weak hydrogen bonds. The base pairs C and G are also bonded togemer by weak hydrogen bonds

ResultsPlus
Examiner Comments

This is a good answer that scores two marks. The candidate has in fact included three creditworthy points in their response: weak hydrogen bonds scores two marks and the description of how the bases pair up could also score a mark.

Question 8 (b)(i)

This question required candidates to write the code for the complementary strand of part of a DNA molecule.

It was surprising to find that many candidates could not remember the correct base pairings.

In some instances candidates wrote a correct and incorrect pairings for the same base, such as T and A and T and G.

Lower case letters were accepted instead of capital letters for the bases.

(b) Figure 16 shows part of a DNA molecule.

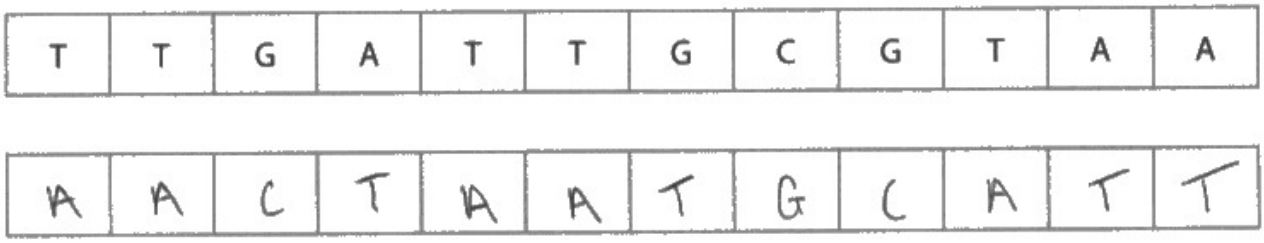

Figure 16

(i) Write the code for the complementary DNA strand in Figure 16.

(2)

ResultsPlus
Examiner Comments

This response is worth one mark. The candidate has made one error – the second G in the top line has been paired to T.

Since all the As and Ts in the top line are paired correctly, one mark can be awarded.

ResultsPlus
Examiner Tip

Always check what you have written before you move on to the next question.

(b) Figure 16 shows part of a DNA molecule.

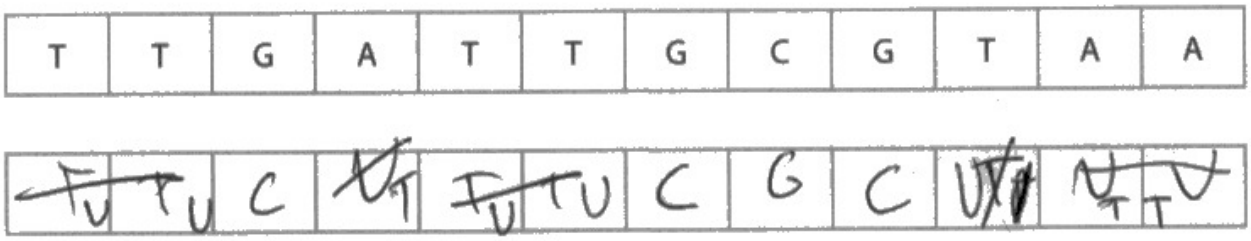

Figure 16

(i) Write the code for the complementary DNA strand in Figure 16.

(2)

ResultsPlus
Examiner Comments

This answer scores one mark. The candidate has paired all of the Cs and Gs in the top line correctly. However, they have written base U instead of base A in the complementary DNA strand, so the second mark cannot be awarded.

ResultsPlus
Examiner Tip

Remember to learn the DNA base pairings.

Question 8 (c)(i)

This question was about extracting DNA from fresh peas and the use of the enzyme protease.

Candidates were asked to explain why protease was added to a mixture of crushed peas, washing up liquid and water.

The vast majority of candidates found the question very challenging and were unable to give any creditworthy points.

(c) A student wanted to extract the DNA from fresh peas.

The student crushed the peas and added washing up liquid and water.

The enzyme protease was then added to this mixture.

(i) Explain why the enzyme protease was added to the mixture.

(2)

to break down the proteins and cell membrane so we only have the DNA strands left

ResultsPlus
Examiner Comments

This response is worth two marks. The candidate understands that protease breaks down proteins, which gains the first marking point.

A second mark can be awarded for the reference to the cell membrane; there is an implication that this is where the proteins are and that it gets broken down.

(c) A student wanted to extract the DNA from fresh peas.

The student crushed the peas and added washing up liquid and water.

The enzyme protease was then added to this mixture.

(i) Explain why the enzyme protease was added to the mixture.

(2)

The enzyme protcase was added to the mixture to break down the nucleus walls. This will make ~~it~~ the DNA easier to extract.

ResultsPlus
Examiner Comments

This answer scores one mark for the reference to breaking down the nucleus. The candidate has not linked protease to the breakdown of proteins.

(c) A student wanted to extract the DNA from fresh peas.

The student crushed the peas and added washing up liquid and water.

The enzyme protease was then added to this mixture.

(i) Explain why the enzyme protease was added to the mixture.

(2)

To help break down the cells of the pea enabling a faster extraction of D N A

ResultsPlus
Examiner Comments

This response is worth one mark for breaking down the cells.

There is no reference to protease breaking down proteins.

ResultsPlus
Examiner Tip

If a specific type of enzyme is given in a question, think about what that enzyme does.

Question 8 (c)(ii)

This question was about the use of ice-cold ethanol in the DNA extraction procedure.

Relatively few candidates seemed to be familiar with the practical aspects of DNA extraction, so the expected answer of precipitating the DNA (or because DNA is insoluble in ice-cold ethanol) was not seen very frequently.

Question 8 (c)(iii)

This question was about the control of variables in a DNA extraction investigation.

Although many candidates were well-rehearsed in how to answer this type of question, others struggled to come up with any creditworthy points.

Previous examiners' reports have addressed the need for candidates to avoid the use of the generic term 'amount' when referring to quantities of substances.

V (iii) The student wanted to compare the mass of DNA found in fresh peas with the mass of DNA found in fresh beans.

Give **two** variables the student would need to control to make this a valid comparison.

(2)

1 use the same mass of peas and beans.

2 Heat to the same temperature.

ResultsPlus
Examiner Comments

This answer is worth two marks. Using the same mass of peas and beans scores one mark; the candidate has also stated 'heat to the same temperature' and this is sufficient to be awarded a second mark.

(iii) The student wanted to compare the mass of DNA found in fresh peas with the mass of DNA found in fresh beans.

Give **two** variables the student would need to control to make this a valid comparison.

(2)

1 Volume of enzyme added to each mixture.

2 Volume of ethanol added to each mixture.

ResultsPlus
Examiner Comments

This response scores two marks. The candidate has given two quantities that would need to be controlled: the volume of enzyme (protease) and the volume of ethanol.

(iii) The student wanted to compare the mass of DNA found in fresh peas with the mass of DNA found in fresh beans.

Give **two** variables the student would need to control to make this a valid comparison.

(2)

1 The amount of protease added to the crushed peas

2 How long the mixture was heated for

ResultsPlus
Examiner Comments

This answer is worth one mark. Controlling the length of time the mixture is heated for is the only creditworthy point.

If the candidate had stated that the volume of protease should be controlled, then a second mark could be awarded.

ResultsPlus
Examiner Tip

Remember to be specific about controlling variables.

Always refer to mass or volume instead of 'amount'.

(iii) The student wanted to compare the mass of DNA found in fresh peas with the mass of DNA found in fresh beans.

Give **two** variables the student would need to control to make this a valid comparison.

(2)

1 Have the same amount of beans as they do peas for the experiment

2 Make sure that the beans and peas are both fresh

ResultsPlus
Examiner Comments

This is not a creditworthy response. Use the same mass of peas and beans would have scored a mark, as would use the same number of peas and beans.

The stem of the question tells candidates that the peas and beans are both fresh, so credit cannot be given for restating this point.

Question 9 (a)(i)

This question expected candidates to use their understanding of the term 'median' to interpret data on diseases.

It was pleasing to see that some candidates reorganised the data to find the median value.

Candidates who were familiar with the term usually then gave the correct answer to the question.

Question 9 (a)(ii)

A large proportion of candidates found this maths question very challenging.

The mark scheme allowed for different methods of answering the question. One of the most common reasons for not scoring two marks was dividing 66 million (or 66 000) by the correct value from the table (3.7) instead of multiplying.

(ii) The population of the UK in 2017 was 66 million people.

Calculate the total number of people diagnosed with chlamydia in the UK in 2017.

(2)

66,000,000 ÷ 1000 = 66000

66000 x 3.7 = 244200

244200 people

ResultsPlus
Examiner Comments

This response scores two marks.

The candidate's working is clear and logical.

(ii) The population of the UK in 2017 was 66 million people.

Calculate the total number of people diagnosed with chlamydia in the UK in 2017.

(2)

66,000,000 ÷ 1000 = 660,000

660,000 × 3.7 = 2,442,000

2,442,000 people

ResultsPlus
Examiner Comments

This answer is worth one mark.

The candidate has made an error when dividing 66 million by 1000, so the first marking point cannot be awarded.

ResultsPlus
Examiner Tip

Always show your working, then you can be given credit for the correct steps in your calculation, even if the final answer is wrong.

(ii) The population of the UK in 2017 was 66 million people.

Calculate the total number of people diagnosed with chlamydia in the UK in 2017.

(2)

66000000 ÷ 1000 = 6600

6600 × 3.7 = 24420

24420 people

ResultsPlus
Examiner Comments

This answer is worth one mark. The candidate has written 66 million as 6 600 000, which gives the incorrect answer of 6600 when divided by 1000.

The last step of the calculation scores one mark.

ResultsPlus
Examiner Tip

Always check that you have included the correct number of 0s when you write out large numbers.

(ii) The population of the UK in 2017 was 66 million people.

Calculate the total number of people diagnosed with chlamydia in the UK in 2017.

(2)

$\frac{66\text{ mil}}{1000} = 66,000$ $\frac{66000}{3.7} = 17837.8$

17,838 people

ResultsPlus
Examiner Comments

This response is worth one mark.

The candidate has completed the first step of the calculation correctly for the first marking point, but they have then divided this answer by 3.7 instead of multiplying, so the second mark cannot be awarded.

Question 9 (a)(iii)

This question asked candidates to state why chlamydia can be described as a communicable disease.

It was pleasing to see a large proportion of candidates answering the question concisely and correctly.

(iii) State why chlamydia can be described as a communicable disease.

(1)

It can be spreced from one person to another.

ResultsPlus Examiner Comments

This response gets across the idea of chlamydia being spread from person to person, so the mark can be awarded.

(iii) State why chlamydia can be described as a communicable disease.

(1)

It can be spread from person to person through body fluids

ResultsPlus Examiner Comments

This is a good answer that scores the mark. A response such as 'it can be spread through body fluids' would also be sufficient for the mark.

(iii) State why chlamydia can be described as a communicable disease.

(1)

Because it is a popular disease and can be easily spread around.

ResultsPlus
Examiner Comments

This is not a creditworthy response. The candidate has referred to the disease being spread but there is no indication that this is from person to person.

Question 9 (a)(iv)

This question asked candidates to give one way the transmission of chlamydia can be prevented.

It is pleasing to note that the vast majority of candidates answered the question correctly.

Question 9 (a)(v)

This was a more challenging question which asked candidates to explain why chlamydia can be treated with antibiotics.

Many candidates gave the reason that chlamydia is caused by bacteria, without making a comment about antibiotics killing chlamydia, or killing bacteria.

(v) Explain why chlamydia can be treated with antibiotics.

(2)

Chlamydia is a bacterial disease and antibiotics kill bacteria.

ResultsPlus Examiner Comments

This concise answer is worth two marks.

On its own, the statement 'antibiotics kill bacteria' would score both marks.

(v) Explain why chlamydia can be treated with antibiotics.

(2)

because chlamydia is caused by a bacteria

ResultsPlus Examiner Comments

The candidate has scored one mark for explaining that chlamydia is caused by bacteria.

They have not stated that antibiotics will kill chlamydia or kill bacteria.

Question 9 (b)

This extended open-response question asked candidates to explain how the immune system will respond to protect their body when they are infected with a disease.

A large proportion of candidates attempted to answer the question. Whilst some responses were not relevant to the question asked, the majority of candidates could give at least a simple, creditworthy point. At a basic level, a response such as 'white blood cells are involved', would score a mark at level 1.

To gain a mark in level 2 or level 3, more detailed answers covering more than one area of indicative content were required.

*(b) When a person is infected with a disease, the immune system will respond to protect their body.

Explain how the immune system will respond to an infection caused by bacteria.

(6)

The body sends out antibodies to combat the bacteria and creates more incase that disease ever returns so that the response time will be faster. the immune system sends instant messages to the brain to tell us ~~that~~ to take antibiotics or kind of medicine.

ResultsPlus
Examiner Comments

This is a level 1 response scoring two marks. The candidate has referred to antibodies being produced, although 'to combat bacteria' is a rather vague comment. There is no mention of what produces antibodies although there is a tentative reference to a secondary response.

Overall, this response is just a simple reference to a feature of the immune system.

ResultsPlus
Examiner Tip

Remember to write well-structured answers to six mark questions.

Usually, you need to explain two or three different points. Always try to use relevant biological terms in your answer.

*(b) When a person is infected with a disease, the immune system will respond to protect their body.

Explain how the immune system will respond to an infection caused by bacteria.

(6)

The immune system will respond to an infection caused by bacteria by releasing white blood cells into the bloodstream. White blood cells contain phagocytes and lymphocytes which help stop the spread of the bacteria. Phagocytes roam around and find bacteria cells then engulf them once they've found them.

ResultsPlus
Examiner Comments

This is a level 2 response.

The candidate has explained that phagocytes engulf bacteria and there is also a brief reference to lymphocytes.

Two areas of indicative content have been referred to, putting the response into level 2. A little more detail, such as lymphocytes produce antibodies, would have put this answer at the top of the level.

*(b) When a person is infected with a disease, the immune system will respond to protect their body.

Explain how the immune system will respond to an infection caused by bacteria.

(6)

Antibies will be produced from bone marrow. The antibodies then find the bacteria and attach to the antigen on the surface of the bacteria. The and antibodies then kill the bacteria. After the infection is over the antibodies become memory lymphocytes. These memory lymphocytes stay in the body and know how to fight against the next infection. If there was to be another infection there would be a faster immune response.

ResultsPlus
Examiner Comments

This is a level 3 answer.

There is some initial confusion about antibody production. However, the candidate understands that there are antigens on the surface of bacteria and that antibodies attach to antigens. These points cover two areas of indicative content. The candidate has also given a partial explanation of the role of memory lymphocytes; this is a third area of indicative content, meaning a mark in level 3 can be awarded. However, there is insufficient detail in this response to award a mark at the top of the level.

*(b) When a person is infected with a disease, the immune system will respond to protect their body.

Explain how the immune system will respond to an infection caused by bacteria.

(6)

the disease (a pathogen) would enter the body. The bodies white blood cells called lymphocyte, have antibodies that attach themselves to the pathogens antigens and destroy the disease. The lymphocytes antibodies have to adjust to fit the shape of the antigens, so in this time we may experience symtoms. once the disease has been fought off, the body stores memory lymphocite which ~~dest~~ remembers the exact shape of the antigens if the disease were to enter the body again, making us experience fewer symptoms and the disease being fought off quicker. This is what we call being immune.

ResultsPlus
Examiner Comments

This detailed response scores a mark at the top of level 3.

The response is well-structured and the candidate has referred to all three areas of indicative content; there is also an explanation of the role of antibodies and memory lymphocytes.

Question 10 (a)(ii)

This question asked candidates to name the organelles that release energy during respiration.

A surprisingly large proportion of candidates struggled to recall the correct name of the organelles (mitochondria).

Question 10 (a)(iii)

This question was about the organelle that contains chromosomes.

It was surprising to see that many candidates were unable to make a link between chromosomes and the nucleus.

Question 10 (a)(iv)

This question was about light receptors in the human eye.

In general, candidates were not familiar with the role of rod cells and only a small proportion gave the correct response.

Question 10 (a)(v)

This question was about the roles of two different light receptor cells in the human eye.

A large proportion of candidates found this question very challenging and were unable to give a creditworthy response.

The expected response for two marks is that cell B is a cone cell, which is involved in colour vision.

(v) Describe how the role of light receptor cell B is different from the role of light receptor cell A.

(2)

the light receptor cell B is a cone which picks up and senses colours while the light receptor A is a rod and senses the light intensity

ResultsPlus
Examiner Comments

This answer scores two marks. The candidate knows the name of both types of light receptor cells in the human eye, along with their roles.

(v) Describe how the role of light receptor cell B is different from the role of light receptor cell A.

(2)

Cell B is responsible for detecting colour while cell A is responsible for the light intensity

ResultsPlus
Examiner Comments

This response is worth one mark. The candidate has not been able to recall the names of the light receptors, but they have differentiated between the roles of cell A and cell B correctly.

ResultsPlus
Examiner Tip

Make sure that you learn the names and roles of light receptors in the human eye.

Question 10 (b)(i)

In this question, candidates were required to calculate the time an impulse takes to travel the length of the optic nerve. Relevant data was given in the stem of the question and an equation was provided.

The issue many candidates experienced was ensuring that a common unit was used for length; many failed to recognise that two different units of measurement (millimetres and metres) were given in the stem of the question. Omitting to convert one unit to another meant that the second marking point of the pairs could not be awarded.

Only a small proportion of candidates scored the full three marks for the question, but the majority scored one or two marks.

(b) The optic nerve carries information from the back of the eye to the brain.

The optic nerve is 47 mm in length.

Nerve impulses travel at 75 metres per second.

(i) Calculate the time an impulse takes to travel the length of the optic nerve.

Use the equation: $\text{speed} = \frac{\text{distance}}{\text{time}}$

(3)

47mm -> metres

4.7mm = 4.7cm

4.7cm = 0.047m

0.000626 seconds

$\frac{0.047}{75} = 0.000626$

ResultsPlus
Examiner Comments

This response is worth three marks. The candidate has shown their working, which involves converting millimetres to metres. The final answer has been given to a recurring number, which was an acceptable alternative to 0.0006267 or 0.00063, for example.

ResultsPlus
Examiner Tip

Always check that the units you are working with are the same. If necessary, convert one unit to another, such as millimetres to metres.

(b) The optic nerve carries information from the back of the eye to the brain.

The optic nerve is 47 mm in length.

Nerve impulses travel at 75 metres per second.

(i) Calculate the time an impulse takes to travel the length of the optic nerve.

Use the equation: $\text{speed} = \frac{\text{distance}}{\text{time}}$

(3)

$\frac{47}{75} = 0.63$

0.63 seconds

ResultsPlus Examiner Comments

This answer scores two marks.

Giving 47 divided by 75 in the working shows that the subject of the equation has been changed. The candidate has not converted millimetres to metres, or vice versa and therefore, loses this mark. The final answer has been rounded correctly, so this scores a second mark.

ResultsPlus Examiner Tip

Always remember to work with the same units. Convert one unit to another if necessary.

(b) The optic nerve carries information from the back of the eye to the brain.

The optic nerve is 47 mm in length.

Nerve impulses travel at 75 metres per second.

(i) Calculate the time an impulse takes to travel the length of the optic nerve.

Use the equation: speed = $\frac{\text{distance}}{\text{time}}$

~~$75 = \frac{47}{T}$~~

$75\,m = 75000\,mm$ (3)

~~$T = \frac{25000}{47}$~~

$\frac{47}{T} = 75000$

$T \times 2500 = 47$

$T = \frac{47}{75000} = 0.0006$

0.0006 seconds

ResultsPlus
Examiner Comments

This response is worth three marks. The candidate has converted metres into millimetres and their final answer has been rounded correctly.

Question 10 (b)(iii)

This question asked candidates to state the sense most likely to be affected if the occipital lobe is damaged.

This was a difficult question for many candidates, particularly if the information in Q10(b)(i) and Q10(b)(ii) had been ignored.

The majority of candidates were unable to state sight or vision as the sense most likely to be affected.

Paper Summary

Many candidates demonstrated a good level of knowledge in the early questions of the paper. Throughout the paper they showed they could extract and use data from graphs and tables. Most candidates were able to access the extended open-response questions, demonstrating some knowledge and understanding of eye defects and the immune system.

In general, the application of knowledge of core practicals was challenging for many candidates; scientific terminology also needs to be used more frequently when answering questions related to practical tasks.

Most candidates could access straightforward maths questions, such as calculating the difference in the risk of two people developing cirrhosis of the liver. Calculating the total number of people diagnosed with a disease and calculating the time taken for an impulse to travel proved to be very challenging for some candidates.

Based on their performance on this paper, candidates should:

- Recognise that the word 'explain' means additional scientific information is needed that is linked to the answer given.
- 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 which will not gain credit.
- Consider the context of the question to ensure they apply their scientific knowledge to the situation they are being asked about.
- Develop their practical skills knowledge to ensure they understand the difference between the factors being investigated and controlled variables.
- Check the number of marks given for the question and ensure that they have included enough facts to match the marks available.
- Use scientific terminology accurately where possible in responses.
- Always show the working when doing calculations as a mark can be awarded for errors carried forward in this case.
- Think about the structure of the answer before starting to write, especially when tackling the extended question, to ensure that the answer shows clarity of writing and flows, while also remembering that accurate spelling and grammar in these questions is important.

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