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Examiners' Report
June 2024

GCSE Combined Science 1SC0 1BF

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June 2024

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Introduction

The Combined Science 1BF paper assessed 21 of the GCSE (9-1) Biology paper one specification statements. The six questions being 'ramped' so that complexity increased across each question as well as across the paper. The five topics within the specification were: Key concepts in biology, Cells and control, Genetics, Natural selection and genetic modification. All were roughly equally covered.

Mathematical exercises and experimental procedures were tested along with specific topics including: bacterial structures / functions, human defence systems, the effect of lifestyle choices on health, the extraction of DNA from fruit, selective breeding, haploid and diploid / mitosis and meiosis, stem cells, antibiotics, human evolution (stone tools), enzyme activity and temperature / pH, effects of vaccinations on number of cases of a disease, communicable / non communicable diseases, with the six mark, EOR item covering the reflex arc.

In questions that tested the ability of candidates to apply their knowledge to situations that may be new to them, all the required information needed to lead candidates to the required responses were supplied in the stems of the questions and items.

There seemed to be fewer candidates who annotated the information presented to help them access the items. Overall, it was felt that those candidates who did take time to do this as well as underline key words in the stem of the question gained more marks – mainly through giving greater detail and more creditable reasons and explanations.

The standard of answers was on a par with those given in the 2023 1BF paper with many foundation candidates capable of scoring marks on items that required basic recall of facts, mathematical items and those items where marks could be gained by interpreting given information. It was pleasing to see some excellent, coherent answers accurately applying germane scientific terminology. It was encouraging that more candidates appeared to use the scaffolding provided with a significant number using the diagrams, graphs and information in the stem of the question to guide their responses. Items where this was clearly seen included 2(a)(ii), 4(b), 5(b), 6(b) and 6(d)(ii).

Items that discriminated well included 1(c), 2(a)(ii), 3(a), 4(d)(i), 5(b), 6(c) and 6(d)(ii). Items where discrimination was disappointing included 3(b)(ii), 3(c), 5(b)(ii) with 5(b)(iv) also being hard to access. As in previous years, there were a significant number of items that tested the ability of candidates to apply knowledge to match the '4 and 5' pass grade descriptors, with a pleasing number of candidates clearly showing an understanding of the response required where the command word 'explain' was used. The majority of candidates still had difficulties in developing their responses into a detailed, exemplified series of points to fully answer items where 3 or more marks were available. It was also not uncommon to see a question using the command word 'describe' being extended to include an explanation, for example item 3(a) (by higher scoring candidates), 3(d), 4(d)(ii), and 5(b)(ii).

There was approximately the same number of blank responses to questions as seen in the 2023 1BF paper but a significant reduction in the number of candidates who stopped answering all, or those questions requiring written responses from question 4 onwards.

Answers to items 2(a)(i)-(ii) and 5(b)(v) showed that most candidates were familiar with core practicals.

The mean mark for the paper was down by one mark with a small increase in the standard variation compared to the 2023 paper although the two six-mark EOR on the reflex arc discriminated well than in previous series, with the majority of candidates achieving Level 0, 1 and 2 and a lower number of candidates being able to access Level 3.

This was disappointing as there was a higher level of scaffolding in the diagram supplied in Figure 10 with neurones X, Y and Z identified, as well as key structures such as the spinal cord and the muscle in the area that would execute the action resulting from the action potential being transmitted through the reflex arc. The ability to extract and analyse salient data was in line with previous years.

The number of candidates using extra paper or writing long responses that resulted in part of their answer being 'out of clip' were better than in previous years and it was noticed that many 'out of clip' responses were due to candidates restating the stem of the question – although it is recognised that this practice may well help candidates access those points that were mark yielding.

Overall it was pleasing to see excellent answers to some more complex questions that covered the required depth and detail outlined in the specification.

Question 1 (a)(ii)

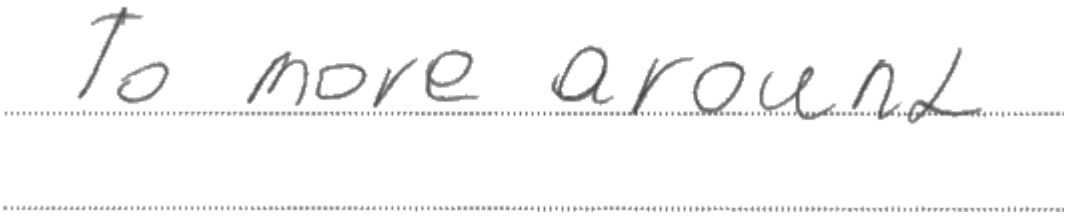
Candidates were presented with a diagram of a bacterial cell and had to name structure Z, the flagellum.

Over three quarters of the candidates scored the mark here with roughly equal numbers stating that structure Z was the flagellum, or the tail.

Question 1 (a)(iii)

To gain credit, candidates had to state the function of structure Z, the flagellum. Again, candidates scored well here with an even greater number of candidates scoring than on Q01(a)(ii). Although most candidates stated that Z was used for movement / to swim, many exemplified this with, for example, to move around the body when they infect you, or, to move to where there is food. It was not unusual for candidates to refer to the bacterial cells as sperm and so state that the flagellum was used by the bacterial cell to swim to the egg. These responses were still credited as the candidates knew that the flagellum was used for movement.

(iii) State the function of structure Z.



ResultsPlus
Examiner Comments

A succinct answer to gain the mark available for this item.

ResultsPlus
Examiner Tip

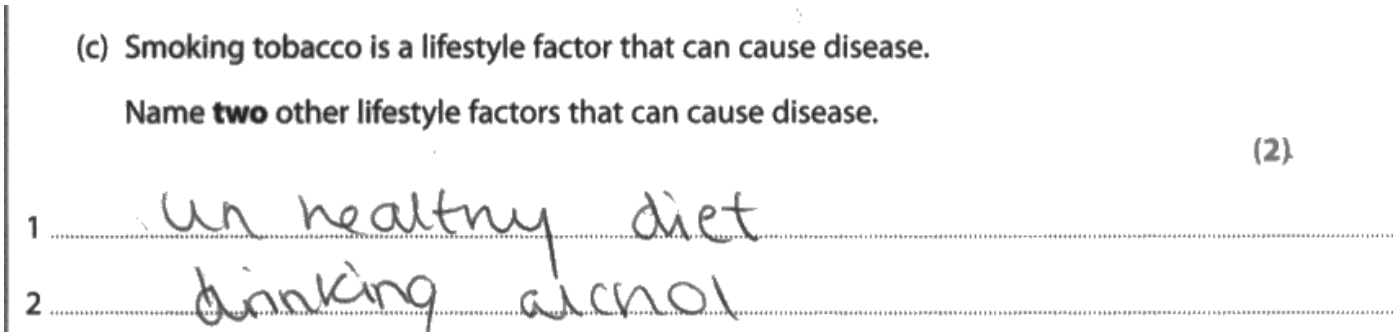
When asked to state the function of a structure or substance, keep your answer simple, but to ensure the mark is awarded, it is often helpful to make the response clearer by exemplifying your answer.

Question 1 (b)

To gain credit here, candidates had to join boxes to correctly link 'hydrochloric acid' to 'destroys pathogens in the stomach' and 'skin' to 'stops pathogens entering the body'. This item also scored well with again approximately three quarters of candidates scoring both marks available. The number of candidates who drew more than one line from each body defence box was relatively low, but similar to the numbers recorded in recent years.

Question 1 (c)

All four of the listed creditable responses were regularly seen with acceptable other named lifestyle choices including poor hygiene / drinking contaminated water, having unprotected sex and sunbathing / using UV beds. Just having sex or your diet were considered insufficient for credit. This was an accessible item with approximately two thirds of candidates gaining both marks available, with a further quarter of candidates gaining one mark. Some candidates lost a mark by giving a different version of the same factor, eg smoking tobacco and vaping.



(c) Smoking tobacco is a lifestyle factor that can cause disease.

Name **two** other lifestyle factors that can cause disease.

(2)

1 un healtny diet

2 drinking alcnol

ResultsPlus
Examiner Comments

Although an answer that is not as defined as would be liked, unhealthy diet was deemed to be just sufficient for MP3 to be awarded and drinking alcohol was MP1, so two marks awarded.

ResultsPlus
Examiner Tip

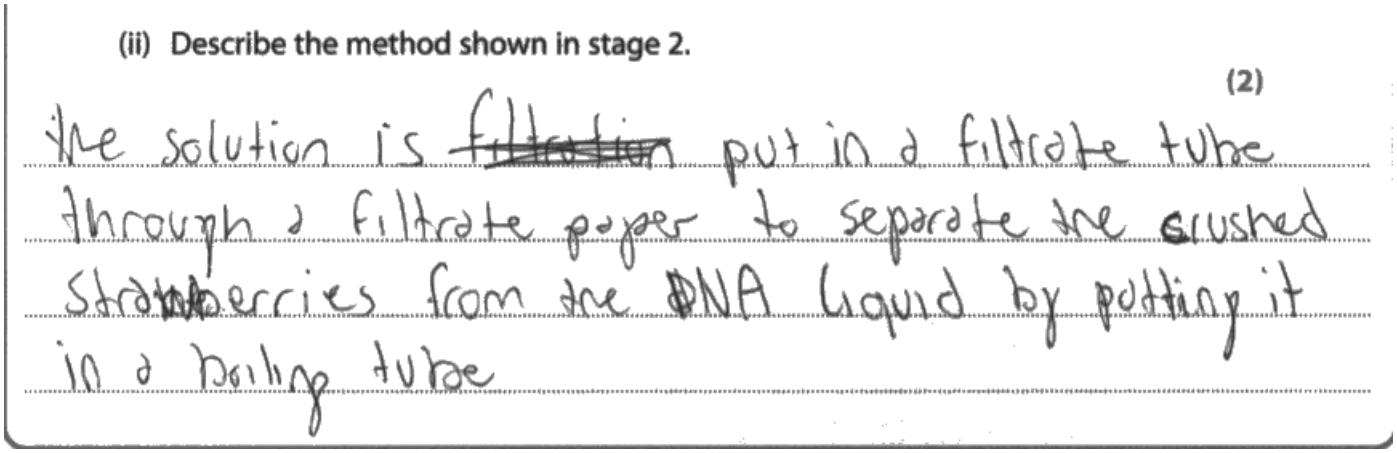
Although unhealthy diet was credited it is a little weak so try to exemplify a less clear response. Here the candidate could have said unhealthy diet with too much fat in it.

Question 2 (a)(i)

Approximately three quarters of candidates scored both marks available with a further fifth scoring one mark. The high number of candidates that scored with 'salt' and 'membranes' showed a good ability to extract information from the procedure presented in the stem of the question.

Question 2 (a)(ii)

This item required candidates to interpret the information shown in stage 2 of the DNA extraction procedure outlined in Figure 2. The number of candidates scoring 0, one and two marks were roughly equal, with candidates that did not gain full marks having problems expressing the idea of filtering and failing to state that the solid / lumps of strawberry were kept in the filter paper and that (just) the DNA and the liquid pass through the filter paper into the test tube.


(ii) Describe the method shown in stage 2.

(2)

the solution is ~~filtration~~ put in a filtrate tube through a filtrate paper to separate the crushed strawberries from the DNA liquid by putting it in a boiling tube

ResultsPlus
Examiner Comments

This response scores both marks available. Although not eloquently put, the candidate has explained that the mixture is poured through a filter / filter paper and that this separates the larger lumps of strawberry which stays in the filter paper from the solution of DNA and ethanol, with the latter two substances passing through into the boiling tube.

ResultsPlus
Examiner Tip

In this type of question, where you are interpreting a practical procedure shown in a series of diagrams, marks can be gained by summarising what can be seen in the diagram so the minimum response you can aim for is just saying what you can see.

Question 2 (b)(ii)

Candidates tend to have a good understanding of how to calculate the mean shown here where seven out of ten candidates correctly calculated the mean as 6.4 thus scoring the available mark. The numbers required from the table did not have to be extracted from a range of results, hence just one mark being available.

Question 3 (a)

This was a more testing question where candidates had to describe how selective breeding has produced modern day chickens that lay high numbers of eggs per year. What was not clear to many candidates was that the red jungle fowl were included in the stimulus material as modern day chickens are direct descendants of these smaller fowl that lay much fewer eggs per year.

Most candidates realised that the modern day chickens were a product of breeding but only 4 in 10 candidates could express that the chickens bred had to be selected, that those selected would be the ones that laid large number of eggs with the process being repeated over many generations. There was no mark awarded for just saying breed eg chickens and many candidates that scored just two marks often just sated breed these 'chickens / jungle fowl' without the concept of repeating (over many generations).

3 Scientists think that chickens were domesticated from red junglefowl thousands of years ago.

Figure 4 shows some information about these birds.

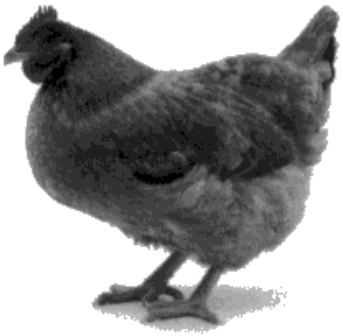
information	red junglefowl	domesticated chicken
photograph	 (Source: © Jamil Bin Mat Isa/ Shutterstock)	 (Source: © Tsekhmister/ Shutterstock)
mass of adult in kg	0.75 to 1.2	2.5 to 3.0
number of eggs laid per year	10 to 15	250 to 300

Figure 4

(a) Describe how selective breeding has produced chickens that lay large numbers of eggs.

(3)

Two hens mother chickens that ~~produce~~ lay the most eggs are selected. The A mother chicken that lays the most eggs per year is selected. A male chicken with a mother chicken that ~~produce~~ lays the most eggs is selected as well. The sperm and egg cell are then put together to create a chicken that lays alot of eggs. This process is then repeated over and over for many generations

ResultsPlus
Examiner Comments

An excellent response showing a good understanding of the process to produce offspring with the desired traits. This candidate also bred a male and a female chicken unlike the vast majority of candidates who bred chickens that laid lots of eggs with other chickens that laid lots of eggs.

ResultsPlus
Examiner Tip

When presented with a difficult concept / procedure, remember that there is large amount of information provided and to help make sense of the useful and relevant points, underline key words and information.

3 Scientists think that chickens were domesticated from red junglefowl thousands of years ago.

Figure 4 shows some information about these birds.

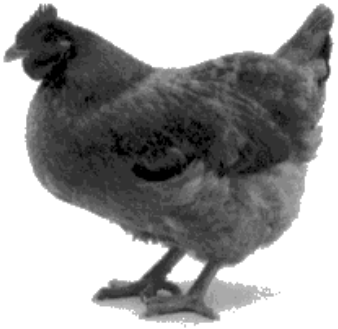
information	red junglefowl	domesticated chicken
photograph	 (Source: © Jamil Bin Mat Isa/ Shutterstock)	 (Source: © Tsekhmister/ Shutterstock)
mass of adult in kg	0.75 to 1.2	2.5 to 3.0
number of eggs laid per year	10 to 15	250 to 300

Figure 4

(a) Describe how selective breeding has produced chickens that lay large numbers of eggs.

(3)

The domesticated chickens are now much larger and and weigh twice as much as the red junglefowl. So they are able to lay more eggs

ResultsPlus
Examiner Comments

A not uncommonly seen response from this candidate who has basically rephrased the information rather than addressed the task to explain how the chickens who lay high numbers of eggs per year have been produced through selective breeding.

ResultsPlus
Examiner Tip

From the task set, this item is clearly about selective breeding. When finished, or at the end when you have finished the paper, revisit these more difficult items and ask yourself: have I answered the question set.

Question 3 (b)(ii)

Candidates were presented with the fact that chickens have 78 chromosomes in their body cells and were asked to state the number of chromosomes that would be present in chicken gametes. A wide range of numbers were seen with 23 (the number of chromosomes in human gametes) not an uncommon answer seen. Over half of the candidates scored the available point by correctly stating the number of chromosomes in chicken gametes is 39.

Question 3 (c)

Candidates were presented with a partially completed table showing that body cells are produced by the process of mitosis. The task was to complete the table by writing the process that produces gametes and the number of daughter cells produced in both processes. One quarter of candidates scored no marks here which was disappointing, as was the number of blank responses seen for an item where the numbers could be guessed. Of the rest of the candidates, relatively few scored two marks, along with those that scored one mark, mainly getting their marks for the number of cells produced by either or both of mitosis or meiosis.

(c) Complete the table to compare the production of body cells and gametes.

One box has been completed for you.

(3)

type of cell produced	type of cell division	number of daughter cells produced
body cell	mitosis	46
gamete	meiosis	23

ResultsPlus
Examiner Comments

One mark is scored here for meiosis. The candidate has unfortunately used the numbers of chromosomes present in body cells and gametes instead of the number of cells produced.

(c) Complete the table to compare the production of body cells and gametes.

One box has been completed for you.

(3)

type of cell produced	type of cell division	number of daughter cells produced
body cell	mitosis	2 identical
gamete	meiosis	4 non-identical.

ResultsPlus
Examiner Comments

A good clear response gaining all three marks available.

ResultsPlus
Examiner Tip

This question asks for the number of cells produced. Do not add extra information as although here, the additional information does not affect the marking of the response, in other situations it may, and so you may lose the marks that would have been given for the correct answer.

Question 3 (d)

Candidates did not find this item accessible with well over half not able to describe the function of stem cells with a higher than average number of blank responses seen. Candidates that did score gave relatively basic responses regarding making new cells.

Relatively few candidates developed this to different types of cells to answer the question, why this cell production / differentiation was needed: for growth, cell replacement and repair of tissues. Some excellent answers were seen with salient and germane examples but these were relatively rare.

(d) Some animal cells are stem cells.

Describe the function of stem cells.

(2)

They share all of the starch which is held ~~held~~ for when ~~their~~ there is a lack of photosynthesis. mainly for winter.

ResultsPlus
Examiner Comments

Several examples were seen where candidates saw the word stem and thereby answered the question in terms of plant stem cells.

(d) Some animal cells are stem cells.

Describe the function of stem cells.

(2)

Stem cells can ~~dree~~ difreniate into any type of cell. there two tyes. Adult stem cells and Embratic stem cells.

ResultsPlus
Examiner Comments

A basic response stating that stem cells can differentiate into any type of cell, but not answering the question fully, gaining just one mark out of the two available.

ResultsPlus
Examiner Tip

Always reread your responses – at the end of the exam if time allows and ask, "have I answered the question set"?

Here the candidate has stated what stem cells can do without developing this to say why stem cell replication and differentiation are needed.

(d) Some animal cells are stem cells.

Describe the function of stem cells.

(2)

The function of stem cells helps the animals function and keep them healthy and a long enough life expectancy.

(Total for Question 3 = 10 marks)

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Examiner Comments

A not uncommon response that receives no marks as the candidate has described such general points that none of the marking points have been met.

ResultsPlus
Examiner Tip

In this type of 'describe' question, the candidate has to state what the stem cells can do and then why this is relevant to the organism. The key to address this kind of 'describe' task is to practice them, breaking them up into the two component parts required to gain all marks available.

Question 4 (a)(i)

This item tested candidate's understanding of the use of antibiotics by asking why they are not used to treat the common cold. The basic idea that antibiotics only kill bacteria could be expressed in several ways, eg the common cold is not caused by bacteria, which was a common response seen by approximately a third of candidates that scored the mark. There was no mark for saying: 'because the common cold is caused by a virus' as this information was given in the stem of the question. As in past examination series, there was no mark awarded for saying that antibiotics 'fight', or 'get rid of' bacteria.

4 (a) The common cold is caused by a virus.

(i) Give **one** reason why antibiotics are not used to treat the common cold.

(1)

Because antibiotics are used to treat bacterial infections and a virus isn't a bacterial infection.

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Examiner Comments

A concisely written response that expresses the creditable information concisely.

4 (a) The common cold is caused by a virus.

(i) Give **one** reason why antibiotics are not used to treat the common cold.

(1)

A common cold is nor ~~caused~~ a dangours cold so ~~you~~ there is no need for a some antibiotics.

ResultsPlus
Examiner Comments

This is a commonly seen response that does not gain credit.

This is one of many questions that we have asked during this specification series that test information that is clearly stated in the specification (Topic 5 point 16).

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Examiner Tip

Ensure that you learn these basic pieces of knowledge and have them reinforced / revised thoroughly in the preparation for the examination. This can be achieved by having a set of key words to define or key concepts written out with blanks to fill in.

Question 4 (b)

Candidates found this item hard to access with many just stating / describing the information that is shown in the diagram which could pick up a mark for MP5. Less than half the candidates scored any marks with less than 2% gaining all four marks available. Marking Points 3 and 6 were very rarely seen, with Marking Points 1 and 4 only seen occasionally.

A common error was to write about the resistant bacteria killing the non-resistant bacteria. Another common error was to write about these bacteria being the product of evolution rather than answering the question.

(b) Figure 5 shows the effect of adding an antibiotic to a culture of bacteria.

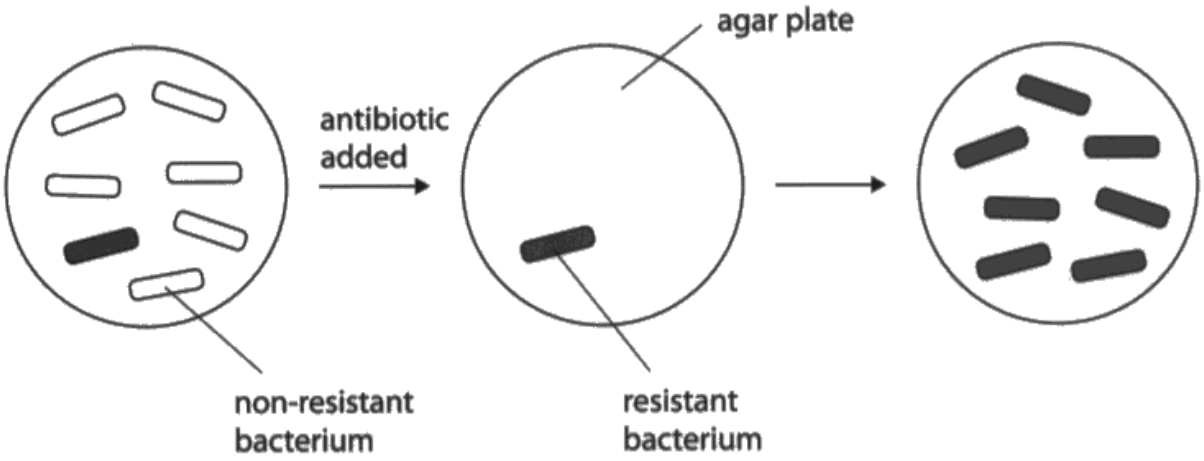

Figure 5

Explain how antibiotic-resistant bacteria have evolved.

Use information from Figure 5 in your answer.

(4)

Over time, the fittest survived. They were adapted over evolution. The ones who were in the best condition survived, and now there is antibiotic resistant bacteria. If you stop taking antibiotics before the course is over, you will also become antibiotic resistant. Because the white blood cells think the antibiotic is a pathogen. It works hard to fight it off and the memory lymphocytes remember it, so it will make sure it does fight it off instantly

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Examiner Comments

This candidate gets just one mark for MP2.

The rest is non-creditable points about evolution and white blood cells. If the candidate had described that once the non-resistant bacteria are removed then the resistant bacteria reproduces / in the end there are only resistant bacteria, they would be likely to pick up 1 or 2 more marks. 'Explain' is the command word, not 'describe', so just saying what you see would be unlikely to generate marks but saying why the changes occurred would.

(b) Figure 5 shows the effect of adding an antibiotic to a culture of bacteria.

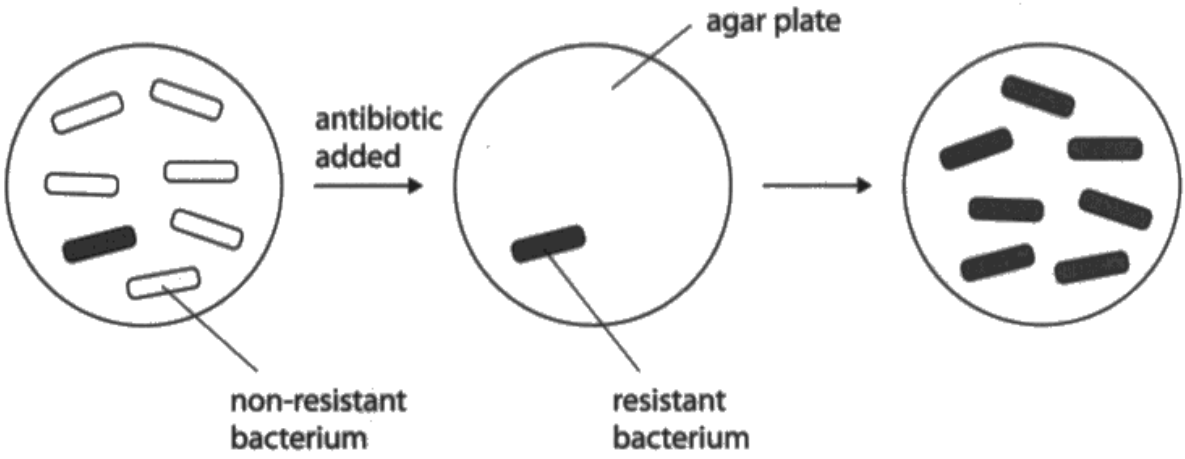

Figure 5

Explain how antibiotic-resistant bacteria have evolved.

Use information from Figure 5 in your answer.

(4)

Antibiotics are taken into the body to kill bacteria, as the non-resistant bacteria will die off, while the resistant bacterium does not die off due to mutation. This resistant bacterium will start to multiply rapidly, therefore resulting in more resistant bacteria in the body due to natural selection, as the resistant bacterium was able to survive and multiply

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Examiner Comments

This response is not that different to the previous one mark question but this gains more marks for the correct use of the term 'mutation' and also through describing how the elimination of the non-resistant bacteria can allow the resistant bacteria to multiply.

Question 4 (c)

Candidates were given the fact that stone tools gave evidence for human evolution and asked to give **one other** source of evidence for human evolution. This item was relatively well answered with over half the candidates scoring the mark available with the majority of marks scored gained by talking about changes in human skeletons / named parts of human skeletons, predominately skulls, but also through references to (the differences between) Ardi and Lucy as well as cave paintings and changes in artifacts found eg carved figures. Responses that were not creditable included general references to evolution or stating looking at how people changed.

(c) One source of evidence for human evolution is from stone tools.

Give **one** other source of evidence for human evolution.

Bone skull structure of a human skull. (1)

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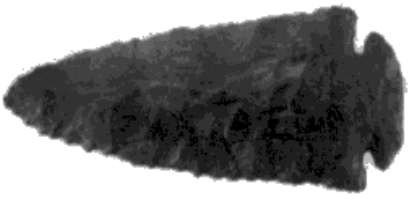
Examiner Comments

The mark available is awarded for this response but the candidate has given a better response than many that just stated comparing human skulls by stating what feature of human skulls is useful illustrating evolution.

Question 4 (d)(i)

Candidates were presented with two stone tools of ages 4 000 years and 100 000 years old. As with many items that use 'explain' as the command word, candidates were required to state a difference and then develop the response to say how this related / supported a secondary statement, here how the differences provided evidence for human evolution. Approximately half of the candidates gained the first mark by stating that tool A was sharper / more pointed, more serrated or more complex, with a reasonable number of these extending the answer to hit MP3 – saying that the differences showed that the humans that made tool A were more intelligent or more rarely that these humans had greater skill. Very few candidates managed to hit both of these latter points and gain all three marks available.

(d) Figure 6 shows two stone tools.



(Source: © John Kepchar/Shutterstock)

tool A
approximately
4 000 years old

(Source: © Eduardo Estellez/ Shutterstock)

tool B
approximately
100 000 years old

Figure 6

(i) Explain how these tools provide evidence for human evolution.

(3)

DNA can be found on these tools and used by scientists to provide evidence and answers.

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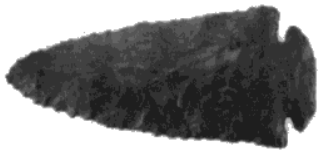
Examiner Comments

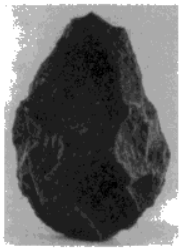
A relatively common response that is not creditable as DNA from humans would not survive on stone tools.

(d) Figure 6 shows two stone tools.



(Source: © John Kepchar/Shutterstock)

tool A
approximately
4 000 years old



(Source: © Eduardo Estellez/ Shutterstock)

tool B
approximately
100 000 years old

Figure 6

(i) Explain how these tools provide evidence for human evolution.

(3)

It is evident that overtime humans have evolved and have became more intelligent. Tool B, from 100,000 years ago wasn't crafted as well as tool A. Tool B ~~has been~~ would've been made for hunting but is more round and smooth. Tool A is very rigid, ~~has~~ or very sharp end with more shape. This shows that overtime humans have evolved being more clever and intelligent.

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Examiner Comments

A good response that gains all three marks available, linking tool A being better crafted (skill) with being sharper and thereby the human that made it having greater intelligence.

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Examiner Tip

When writing your response to a three mark 'explain' question, make sure that you include three clear points that are linked to answer the question posed.

Question 4 (d)(ii)

This item did not score as well as expected with less than half of the candidates scoring any marks, with the majority of candidates that did score stating that stone tools could be dated by looking at the layer of rock in which they were found, with the less common answer of compared to other tools of known age.

Some candidates did not score as they stated, 'where the stone tools are found', which could mean where in the country / field it was found. Other candidates gave a vague response of seeing if it looked like another tool, but for credit this needed to be another tool that had already been dated. A few candidates looked for a 'date mark' on the tool. Carbon dating was not credited as stone tools do not contain carbon, however carbon dating eg wood found with the tool would be credited as would the more general 'radiometric' dating or a named type of radiometric dating that would work.

(ii) Describe **two** methods that scientists use to date stone tools.

(2)

1 One way to date the tools back is by seeing how old the dirt on rocks are from where the tools were dug up

2 another way is that you can look at sharpness of the stone tools

ResultsPlus Examiner Comments

Neither response is creditable here. The vague response of seeing how old the dirt on it is not creditable as it does not say how the dirt would be dated and sharpness may give an idea of relative age of one tool compared to another without actually allowing the date the tool was made to be determined.

ResultsPlus Examiner Tip

Check your answer to ensure it has answered the question, here dating is not the same as relative dating.

Question 5 (a)

The vast majority of candidates scored the plotting mark with those that did not score MP1 plotting the points in a straight line or plotting the last point at 35^{o}C instead of 40^{o}C. Significantly fewer candidates were able to draw a suitable line of best fit for their plotted data, with many drawing a straight line of best fit which could be awarded if it was felt to be reasonably placed or a line that joined the points 'dot to dot'.

5 A student investigated the effect of temperature on the rate of reaction of the enzyme pepsin.

Figure 7 shows the data collected.

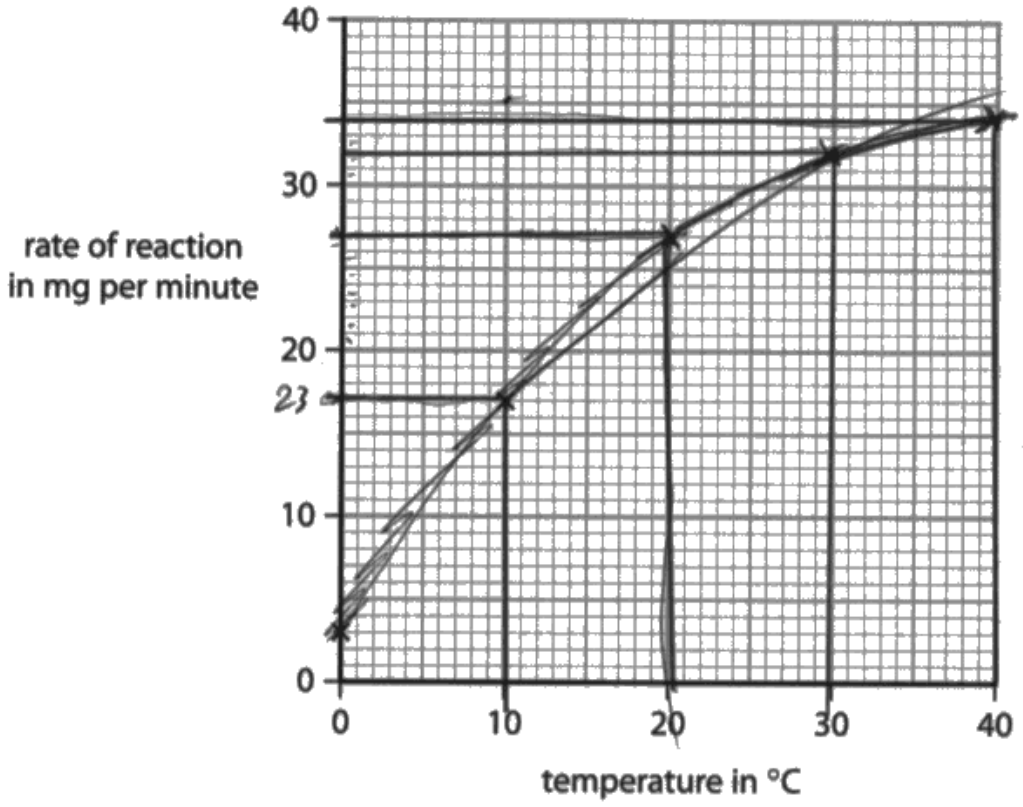
temperature in °C	rate of reaction in mg per minute
0	3.0
10	17.0
20	26.0
30	32.0
40	34.0

Figure 7

(a) Complete the graph by plotting the results shown in Figure 7 and drawing a line of best fit.

The first two points have been plotted for you.

(2)



Plotting point is awarded here, however, there are multiple lines drawn so MP1 is not awarded.

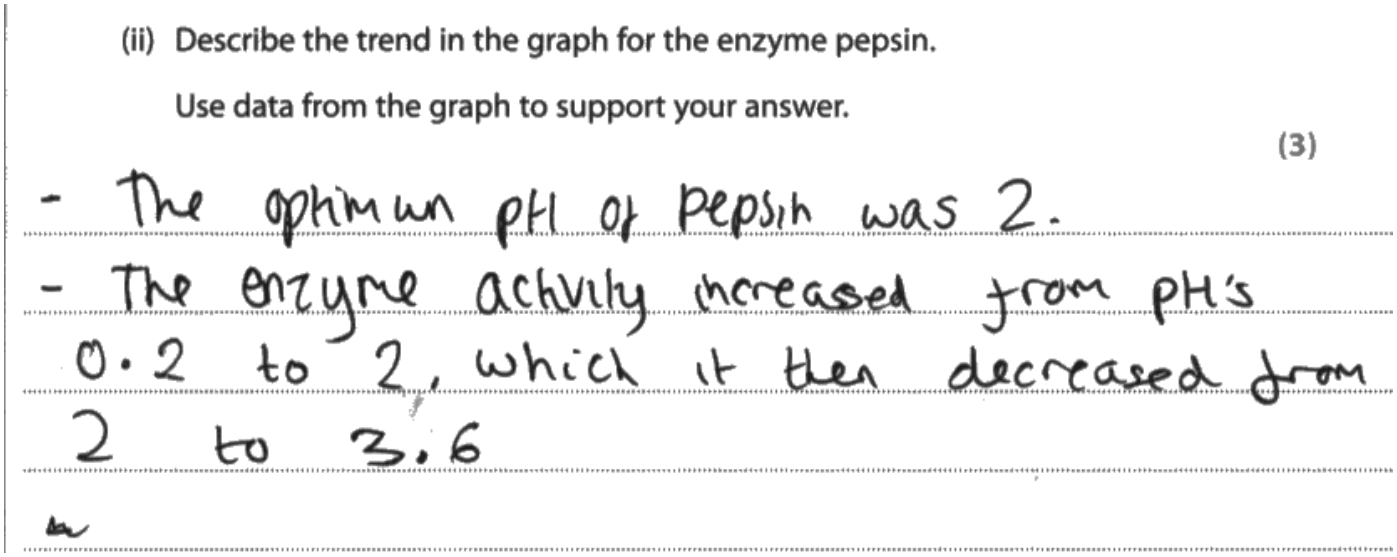
If the instruction says draw **a line** OR **one line** ensure that you do not draw multiple lines.

Question 5 (b)(ii)

Candidates were required to interpret the data presented in graphical form for enzyme activity for pepsin. There were three marks available here and candidates were told to use data from the graph to support your answer. The number of candidates scoring, one, two, three or four marks were roughly evenly spread with slightly less scoring two marks.

For a basic Level 1 mark, most candidates stated that activity increased and then decreased which only gained the increased mark as the decreased mark had to be linked to after pH2 (the optimum pH).

Many candidates stated 'optimum' for pH2 which gained credit, with many of those candidates that scored all three marks available simply stating that the enzyme activity increased to the optimum pH of 2 and then decreased. Many candidates also stated to pH 3.5/3.6.



(ii) Describe the trend in the graph for the enzyme pepsin.

Use data from the graph to support your answer.

(3)

- The optimum pH of Pepsin was 2.
- The enzyme activity increased from pH's 0.2 to 2, which it then decreased from 2 to 3.6

ResultsPlus
Examiner Comments

A clear three mark response with the trend described and supported by salient data taken from the graph.

ResultsPlus
Examiner Tip

This item requires the candidate to describe how enzyme activity is affected by pH and so the easy part is to write that activity increases and then decreases. However this candidate has noted that data needs to be used to support the answer and so has stated the pH for key points from the graph as well as including the technical term 'optimum' to gain the maximum marks available.

Question 5 (b)(iii)

A straightforward item requiring candidates to know that optimum pH refers to the maximum enzyme activity for trypsin (8) read from the graph. 0ver three quarters of candidates scored the available mark on this item.

Question 5 (b)(iv)

This item is also based on Figure 8, and the enzyme activity for trypsin and asked the candidates to explain why there was no enzyme activity for trypsin at pH5.

Candidates surprisingly found this hard to access, with over three quarters of candidates scoring 0 marks. Almost 1 in 5 candidates scored one mark with many simply stating that there was no enzyme activity because pH5 was too low or more scientifically pH5 was too acidic. Less than 1 in 20 candidates were able to extend this response to cover the ideas regarding enzyme denaturation to gain more marks.

(iv) **Explain why there is no trypsin activity at pH 5.**

(3)

When the pH level is too low & enzyme denatures and the active site changes shape and won't fit with the substrate and because of that there is no activity.

ResultsPlus
Examiner Comments

A good description covering all marking points to gain maximum marks for this item.

ResultsPlus
Examiner Tip

For all 'explain' items, remember that the word 'because' or equivalent should be used as a description cannot get all the marks available.

Question 5 (b)(v)

Over two thirds of candidates did not score in this item as they merely stated that the temperature should be kept the same or that the investigation should be carried out in the same room whereas to gain credit they had to state how the experiment could be kept the same, eg using a water bath, which was the most common creditable answer seen, or using an incubator or keeping the investigation in a room kept at the same temperature by setting the thermostat.

(v) Temperature is a variable that should be controlled in this investigation.

Give **one** way the temperature could be controlled.

(1)

Keeping the temperature the same for all tests of both pepsin and trypsin.

ResultsPlus
Examiner Comments

No marks are awarded for this response as the candidate has said it should be kept the same, but has not given a way to keep the temperature the same.

Question 6 (a)(ii)

Almost half of the candidates scored here by saying that the pathogen that causes malaria is spread by mosquitoes, or by the more general response of by an animal vector, with some candidates gaining credit for saying through the blood – which is correct for describing how the malaria parasite spreads through the body, with some of the latter group even saying that the pathogen that causes malaria spreads through the body in the blood with many ending up in the liver.

(ii) State how the pathogen that causes malaria is spread.

Through The blood

ResultsPlus
Examiner Comments

A commonly seen creditable response that describes how the plasmodium, the malarial parasites, spreads through the body.

Question 6 (b)

Figure 9 presented candidates with the number of measles cases **reported** in 1985, 1995, 2005 and 2015. A significant number of candidates missed the 'reported' and so did not gain credit by saying that medicine has improved so they were treated (more) quickly, when the creditable response is that more children were vaccinated, or correct references to herd immunity.

(b) Measles is a disease caused by a virus.

Figure 9 shows the number of measles cases reported in England and Wales from 1985 to 2015.

year	number of measles cases reported
1985	97 408
1995	7 447
2005	2 089
2015	1 193

Figure 9

Explain **one** conclusion that can be made about the change in the number of measles cases reported from 1985 to 2015.

(2)

one conclusion that can be made is over the years from 1985 to 2015 the amount of cases has decrease. this suggest that the virus isn't common any more due to it dropping from 97408 to 1193.

ResultsPlus
Examiner Comments

This candidate does not gain credit as they have not stated that the number of cases reported has decreased and then has just rephrased the information presented in the table rather than explaining the trend.

ResultsPlus
Examiner Tip

When quoting / describing trends shown in tables or graphs make sure that the subject is taken from the table heading / graph axis label.

As the command word here is 'explain' the response needs to say, for example, why the change has taken place – here why there are less cases reported or why there are less viruses / cases of malaria reported.

Question 6 (c)

Almost half of the candidates scored here with common creditable responses covering all three of the marking points in roughly equal numbers. Only one of the accepts was allowed to be credited with a rise in temperature and the idea of more white blood cells being produced seen most often.

(c) Describe **two** ways the immune system will respond to an infection by a pathogen.

(2)

1 Release white blood cells to attack the pathogen.

2 Create memory lymphocytes to combat it if infected again.

ResultsPlus
Examiner Comments

This response scores just one mark as Response 1: white blood cells are released all the time does not score, for credit, the candidate has to state **more** white blood cells are produced / released. Response 2 is creditable.

(c) Describe **two** ways the immune system will respond to an infection by a pathogen.

(2)

1 The white blood cells will try too fight it

2 and

ResultsPlus
Examiner Comments

We do not credit unscientific responses such as 'fight it'. Fight is not the same as 'kill' which is true and creditable as would more technical responses involving engulfing and then digesting the pathogen. Also 'it' means 'the infection' due to the way that this item is written and as we cannot kill an infection we do not credit that response.

(c) Describe **two** ways the immune system will respond to an infection by a pathogen.

(2)

1 Release memory lymphocytes after its detected

2 Release anti-bodys to fight the pathogen

ResultsPlus
Examiner Comments

Releasing / producing memory lymphocytes is creditable for MP3 and although Response 2 does not refer directly to white blood cells releasing antibodies, the main point of releasing antibodies is creditable.

ResultsPlus
Examiner Tip

Response 1 clearly matches the mark scheme, Response 2 is just creditable but to ensure that there is no question, improve the response by stating that the antibodies are released / produced by white blood cells (and if you know the type that produces antibodies – B lymphocytes – state it).

Question 6 (d)(i)

Many candidates did not score here as their answer was not specific enough, eg stating that Beriberi is not caught or spread without clarifying how it was spread – here it had to say, for example, Beriberi cannot be caught from another person. Beriberi is not classed a non-communicable disease because it is a deficiency disease was not creditable as this information was given in the stem of the question.

(d) (i) Beriberi is a disease caused by a lack of vitamin B1 in the diet.

Give **one** reason why beriberi is classed as a non-communicable disease.

(1)

because it cannot be spread from person to person its caused by a lack of vitamin

ResultsPlus
Examiner Comments

A clear response that gains the available mark. The last part that is not creditable by itself is just treated as extra information.

(d) (i) Beriberi is a disease caused by a lack of vitamin B1 in the diet.

Give **one** reason why beriberi is classed as a non-communicable disease.

(1)

Because it only a lacle of Vitamin B1 within you.

ResultsPlus
Examiner Comments

Although this candidate's response is correct, it does not answer the question and so does not gain credit.

Question 6 (d)(ii)

It was disappointing that with all the scaffolding supplied in this item so few candidates, over one third, scored no marks and only approximately one in ten candidates managed to access Level 3 of this six mark EOR task.

The diagram in Figure 10 showed a pin pricking an arm and the three neurones labelled neurone X, neurone Y and neurone Z. Referencing the impulse travelling down neurones X, Y and Z would give access to Level 2 and with an extra piece of detail, correct reference to the spinal cord or crossing a synapse with named neurones, X = a sensory neurone, Y = a relay neurone and Z = a sensory neurone for example would access four, five or six marks, depending on the amount of extra detail / number of named neurones.

This item scored well and was clearly accessible to many candidates who gave excellent written accounts of the reflex arc.

Some excellent answers were seen with myelin sheaths described and related to speeding the impulse and neurotransmitters diffusing across the synapse. Some very poor responses were also seen and a common error was to refer to the brain receiving the pin prick stimulus and telling the arm to move away.

*(ii) Beriberi can affect reflexes.

Figure 10 shows a reflex arc.

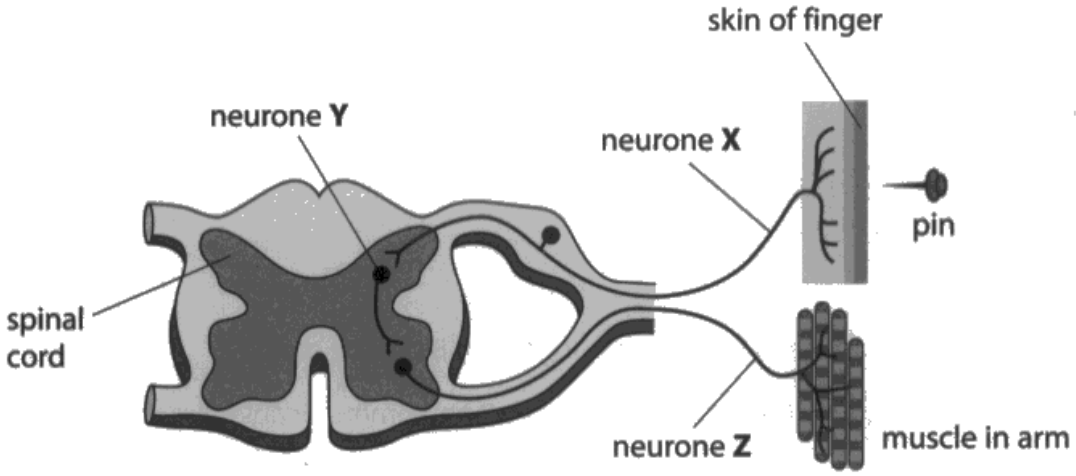


Figure 10

When the skin is pricked by a pin, electrical impulses travel through a reflex arc.

Describe the path taken by electrical impulses from the skin to the muscles in the arm.

Include the names of neurones X, Y and Z in your answer.

(6)

When the skin of the finger is pricked by the pin the electrical impulses are sent through neurone X and travels to the spinal cord where the electrical impulses then reach neurone Y ~~which~~ which then travels trough the spinal cord to Neurone Z and then the electrical impulses travel to the muscle in your arm. ~~and~~ ~~this~~ ~~is~~ when the electrical impulses travel through ~~the~~ neurones X, Y and Z this is called travelling ~~through~~ a reflex arc.

ResultsPlus
Examiner Comments

This candidate has used the diagram to good effect and described in basic ways that the impulse travels through neurones X, Y and Z along with some extra detail, namely reference to the spinal cord. If they had named any one of neurones X, Y and Z, then they would have scored four marks and the top of Level 2 instead of three marks.

ResultsPlus
Examiner Tip

This candidate has clearly read the answer through and added eg 'electrical' in front of 'impulses' to clarify the overall answer. This is good practice, although the advice is to add words to improve / clarify an answer and only change it completely if on checking what is required for the stem of the question you realise that you have completely misread part or all of the instructions.

*(ii) Beriberi can affect reflexes.

Figure 10 shows a reflex arc.

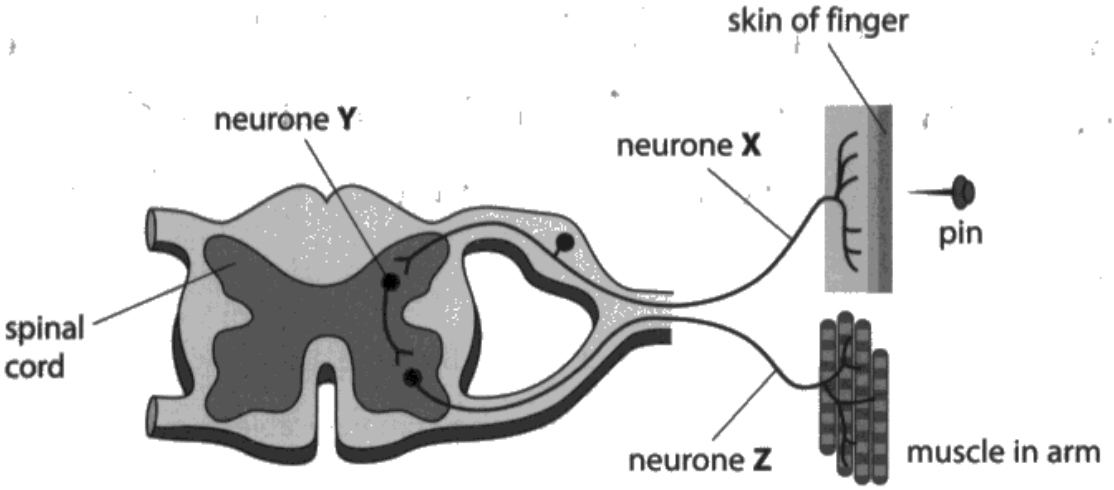


Figure 10

When the skin is pricked by a pin, electrical impulses travel through a reflex arc.

Describe the path taken by electrical impulses from the skin to the muscles in the arm.

Include the names of neurones X, Y and Z in your answer.

(6)

fis First the skin is pricked then the the reflex arc sends an eucrical signal in the covered in myelin Shealth to speed up the transmission and to hinder any damages to the impulse. then it arrives at the synapse and a chemical is released to let the impulse jump accross the function and then the eucrical impulse travels through the myelin Shealth again in till it reaches the muscles in the arm and the impulse tells the muscles to in the

arm to move causing the finger to move away from the pin to get the finger away from the danger, this reflex arc also passes through the spinal cord

ResultsPlus
Examiner Comments

This response scores just two marks which is a pity as the information supplied is good. However, the stem of the question tells the candidate to reference / name neurones X, Y and Z and as they have not done so, they have not fulfilled the requirements and so cannot access higher than Level 1 marks.

ResultsPlus
Examiner Tip

The last instruction of the stem of the question states 'Include the name of neurones X, Y and Z in your answer'. Ensure that you fulfil all the instructions given, or you will limit the marks awarded for your response.

*(ii) Beriberi can affect reflexes.

Figure 10 shows a reflex arc.

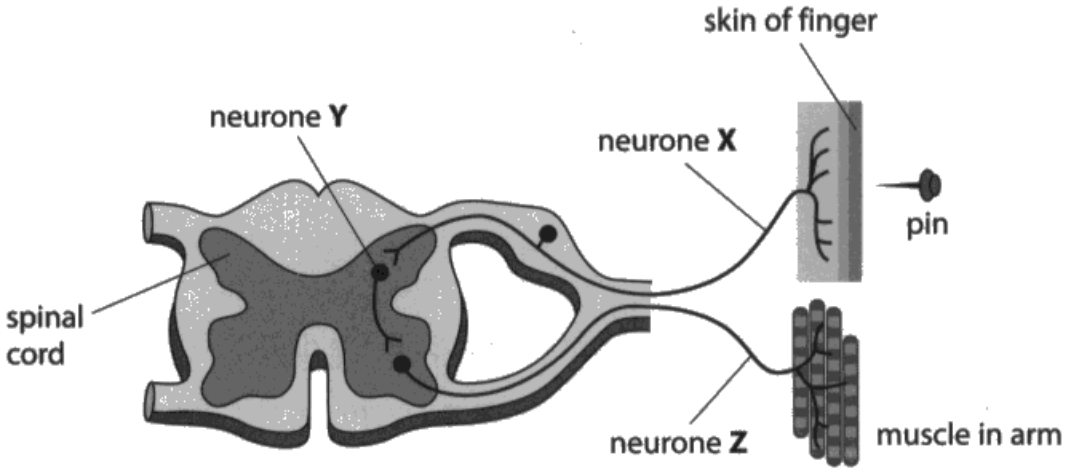


Figure 10

When the skin is pricked by a pin, electrical impulses travel through a reflex arc.

Describe the path taken by electrical impulses from the skin to the muscles in the arm. → stimulus, receptor, sensory neurone, relay neurone, motor neurone and effector

Include the names of neurones X, Y and Z in your answer.

(6)

First of all the pin is a stimulus to the skin the pin sends electrical impulses to the pain receptors. After this the impulse travels to the thing called the Sensory neurone ^ the electrical impulses then travels to the relay neurone, via a synapse. This neurone is located in the spinal cord. After the electrical impulse has gone through the spinal cord is reaches the motor neurone, via another synapse. the electrical impulses finally reach the effector when the muscle contracts because of the reflex being a automatic, fast response to the stimulus.

A good answer to this question that fulfils all the requirements including naming neurones X, Y and Z as well as including correct references to eg synapses.

Paper Summary

Based on their performance on this paper, candidates should:

- Read the question carefully, highlighting / underlining the command word as well as key words and pieces of information to help make your response targeted to what the question is asking you to do. On this point, avoid writing just stock answers to 'explain' and 'describe' items as more often than not you will be required to apply knowledge to a specific situation which is likely to be different to that which was taught.
- Have a clear understanding of the different requirements in answering 'state / give', 'describe' and 'explain' questions. See previous point about underling command words and key points.
- Practise reading the way questions are phrased and consider which parts are key to stimulate the connections to areas of the specification covered.
- Keep your response straightforward and although you should include scientific terminology where it is relevant, do not give alternative ideas as more often than not they disqualify creditable responses.
- Develop responses so that initial points are made clearer, possibly with examples or the use of relevant key biological terms where more than 2 points are available.
- Be as specific as you can be, giving scientific terms and data from eg tables provided where you can. A significant number of marks were not awarded in this examination as candidates did not express clearly enough to gain credit.

Grade boundaries

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