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Examiners' Report
June 2023

Int GCSE Human Biology 4HB1 01R

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Introduction

This paper elicited a wide range of responses, providing opportunities for candidates to demonstrate their knowledge and understanding of Human Biology.

Candidates continue to experience issues with calculations that are set. The specification demands that there will be a minimum of 10% of the marks allocated to calculations which is a minimum of nine marks per paper. Candidates often fail to show their working which is essential, as they run the risk of penalising themselves if it is not clear what their thought processes are.

The quality of diagram drawing was particularly disappointing. Candidates should always attend examinations in Human Biology with a ruler and a sharp pencil. Straight lines cannot be drawn effectively without the use of a ruler or its equivalent and a sharp pencil is required if diagrams are going to be drawn showing the degree of clarity that is required at this level.

Question 1 (a)

There was a wide range of answers to this question with only retina being known by the majority of candidates.

1 (a) The box lists some parts of the eye and the ear.

auditory nerve	ciliary body	~~cochlea~~	iris	lens	~~optic nerve~~
~~ossicles~~	~~pupil~~	~~retina~~	semi-circular canals	tympanum	

Complete the table using words from the box to give the missing information.

(6)

Description	Part
contains light-sensitive cells	retina
membrane that transfers vibrations to middle ear	~~ossicles~~ ~~ciliary body~~ tympanum ~~ossic~~
transmits impulses from the retina to the brain	optic nerve
helps the body to balance	~~ossicles~~ ciliary body
contains muscle tissue that controls light entering the eye	Pupil
converts vibrations into nerve impulses	cochlea

ResultsPlus
Examiner Comments

It is surprising that this candidate has thought that the ciliary body is required for balance.

ResultsPlus
Examiner Tip

Learn the functions of the parts of the eye and ear.

1 (a) The box lists some parts of the eye and the ear.

auditory nerve	ciliary body	cochlea	iris	lens	optic nerve
ossicles	pupil	retina	semi-circular canals	tympanum	

Complete the table using words from the box to give the missing information.

(6)

Description	Part
contains light-sensitive cells	Retina
membrane that transfers vibrations to middle ear	~~cochlea~~ ~~ossicles~~ Tympanum
transmits impulses from the retina to the brain	optic nerve
helps the body to balance	Semi-circular canals
contains muscle tissue that controls light entering the eye	Iris
converts vibrations into nerve impulses	~~tympanum~~ ~~auditory~~ ~~tympanum~~ cochlea ~~tympanum~~

ResultsPlus
Examiner Comments

This candidate got there in the end.

ResultsPlus
Examiner Tip

Think before writing down an answer. Crossings out can be confusing.

1 (a) The box lists some parts of the eye and the ear.

auditory nerve	ciliary body	cochlea	iris	lens	optic nerve
ossicles	pupil	retina	semi-circular canals	tympanum	

Complete the table using words from the box to give the missing information.

(6)

Description	Part
contains light-sensitive cells	retina
membrane that transfers vibrations to middle ear	ossicles
transmits impulses from the retina to the brain	optic nerve
helps the body to balance	Semi-circular canals
contains muscle tissue that controls light entering the eye	ciliary body
converts vibrations into nerve impulses	cochlea

ResultsPlus
Examiner Comments

It was surprising that this candidate thinks that the ossicles are a membrane.

ResultsPlus
Examiner Tip

Learn the parts of the eye and ear.

Question 1 (b)

A common mistake was to not mention that the structure was part of the retina.

(b) Explain what is meant by the blind spot in the eye.

(2)

It is a ~~a~~ spot on ~~t~~ retina where optic nerve is connected ^and ~~with~~ ^has no rod or cone cells.

ResultsPlus Examiner Comments

A good answer that identifies the location and what it is.

ResultsPlus Examiner Tip

Always give full answers.

The blind spot in the eye is where the lens can't be seen as the time goes.

ResultsPlus Examiner Comments

This candidate is clearly confused as to the meaning of blind spot.

ResultsPlus Examiner Tip

Learn the structures and what they do.

Question 2 (a)

Whilst most candidates mentioned that two bones were involved, a fair number suggested that they were joined together or actually described the structure of a joint.

2 The skeleton contains joints.

(a) Describe what is meant by the term **joint**.

(2)

Joint is the point where two bones meet. Allows movement, ale say bones 'articulate' at joints.

ResultsPlus
Examiner Comments

This would have been a perfect answer had it finished at the end of the first sentence. The additional material was unnecessary as this was only a two mark question.

ResultsPlus
Examiner Tip

Use the mark allocation to judge what is required in terms of length of answer.

that are able to move the bones in different direction and ~~cancels~~ prevents the bone from being dislocated

ResultsPlus
Examiner Comments

No real attempt to answer the question, the candidate appears to be writing down random comments.

ResultsPlus
Examiner Tip

Learn definitions of words/structures/processes.

Question 2 (b)(i)

Usually correctly identified though 'tibula' was seen on a number of occasions.

Question 2 (b)(ii)

(ii) Give the functions of tendons and cartilage.

(4)

tendons

tendons are muscles that & help the bones to move.

cartilage

cartilage is a spongy material that supports the bone.

ResultsPlus
Examiner Comments

This candidate had no idea of the functions in any detail. There is a failure to explain how the tendons help the bones to move and this vague answer is not worth any credit.

Cartilage supporting the bone is again a vague answer and tells us very little.

ResultsPlus
Examiner Tip

Learn the functions of the individual components of a joint

They are used to connect muscles with the bone so that they can be used to pull a bone with the help of a muscle

cartilage

They are present at the end of a bone to reduce friction. Cartilage are soft.

ResultsPlus
Examiner Comments

The candidate scores full marks for a clear description of the role of tendons. However, the description of cartilage omits the fact that whilst the cartilage reduces friction this results in smooth movement.

ResultsPlus
Examiner Tip

Learn the functions of the components of a joint.

Question 2 (b)(iii)

Many candidates identified the absence of a ligament but failed to notice that there was only one muscle and that skeletal muscles operate as antagonistic pairs.

(iii) **Give two structures, not shown on the diagram, that would be necessary for the joint to fully function.**

1 Ligament

2 capsule

ResultsPlus
Examiner Comments

Capsule was a common incorrect answer.

ResultsPlus
Examiner Tip

Learn what the components of a joint are.

1 Ligament

2 muscle on bone X.

ResultsPlus
Examiner Comments

A correct reference to ligament and an appreciation that a second muscle is required.

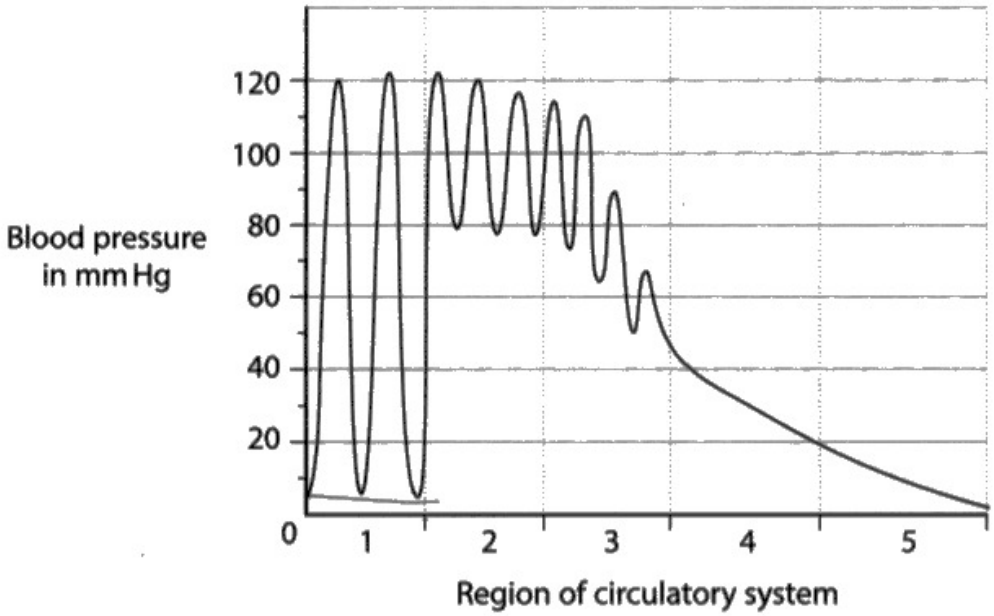
ResultsPlus
Examiner Tip

Draw a diagram of a joint and label all parts and then see if it would work.

Question 3 (a)(i)

This calculation caused few problems for the majority of candidates.

3 The graph shows how blood pressure varies in different regions of the circulatory system.



(a) (i) Estimate the difference between the maximum blood pressure and minimum blood pressure in region 1.

(2)

121 - 5 = 116

difference in blood pressure = 116 mm Hg

ResultsPlus
Examiner Comments

There was a tolerance of plus/minus two for the readings so this candidate had read the figures correctly.

ResultsPlus
Examiner Tip

Ensure that you have a ruler as it makes identifying the correct points much easier.

(a) (i) Estimate the difference between the maximum blood pressure and minimum blood pressure in region 1.

(2)

120 − 5

difference in blood pressure = 115 mm Hg

ResultsPlus
Examiner Comments

This candidate was spot on.

ResultsPlus
Examiner Tip

Ensure that you have a ruler for the exam as it makes identifying the points much easier.

Question 3 (b)

Whilst many candidates did not specifically state that this region of the graph represented the heat, many scored the mark by default as part of their overall description. Many candidates seemed unaware of the systolic and diastolic phases of the heart and seemed to think that the difference in blood pressure was between that in the left hand side and right hand sides of the heart. Candidates often could not describe the sequence of events in a logical way.

(b) Explain why blood pressure varies in region 1.

(5)

They are affected by blood pressure of the ~~near~~ heart. They are responsible to carry out blood inside/outside heart & deliver oxygen again. They need a to withstand the heart contration that creates preasure in the blood vessel. When the blood is not pumped then the blood pressure goes down.

ResultsPlus
Examiner Comments

This is rather a rambling answer with no logical sequence to explain what is happening. There is some reference to the heart contracting and relaxing causing pressure changes.

ResultsPlus
Examiner Tip

Learn the sequence of events for a heartbeat.

Region 1 is the heart. Blood pressure varies due to the difference in pressures from the blood flow of arteries and veins. For instance, aorta and pulmonary ~~vein~~ artery have high pressures since they require to transport ~~oxygen~~ blood to other parts of the body and the lungs. This ~~causes~~ results from the heart contracting harder pumping harder. On the other hand, pulmonary ~~artery~~ vein and vena cava have low blood pressures since they ~~return from other parts & go to the lungs and return~~ return from other parts of the body. Therefore, there is a significant difference in pressure within the heart.

ResultsPlus
Examiner Comments

This candidate does not really understand what the graph is showing. There is an appreciation that it is the heart and that there is relaxation and contraction but again, no real attempt at a logical sequence of events.

ResultsPlus
Examiner Tip

Learn the sequence of events for a heartbeat.

The left ventricles ~~the~~ of heart contain ~~s~~ muscles. They contract and pump blood from heart to ~~the~~ the whole body through the arteries. ~~The~~ When they contract, the blood pressure of blood in aorta increases to its maximum as speed of blood flow as force is exerted to it. ~~and~~ ~~it~~ when the muscles relax, the ~~p~~ blood pressure decreases. Blood pressure is the force ~~of~~ of blood exerted on the ~~arteries~~ walls of blood vessels. There are fluctuations ~~as~~ as the muscles keep contracting and relaxing. When muscles contract, the volume of ~~heart~~ left ventricle decreases, therefore, the blood pressure increases and the blood is push forwards. Volume of left ventricle ~~in~~ increases when muscle relax.

ResultsPlus
Examiner Comments

This candidate gives a clear sequence of events with a clear statement that it is the heart and then a description of the heart contracting and relaxing causes changes to blood pressure. The candidate put in more material than is required.

ResultsPlus
Examiner Tip

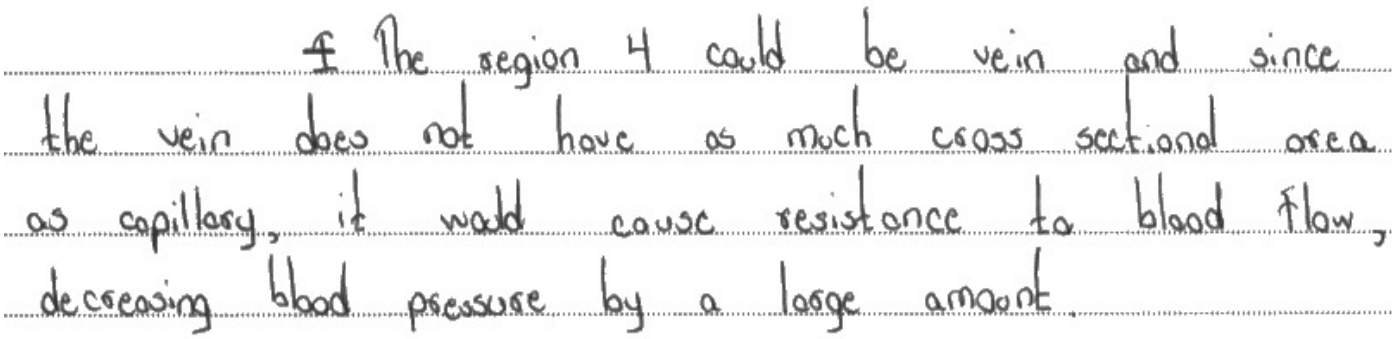
Learn the sequence of events for a heartbeat.

Question 3 (c)

Candidates struggled to identify this region as the capillaries. Very few candidates made any reference to the fact that there is no pulse but just referred to the pressure dropping. There were few references to a lack of muscle/elastic tissue in the walls which would prevent pulsation.

(c) Explain why the blood pressure changes in region 4.

(4)



ResultsPlus
Examiner Comments

Only a reference to pressure falling but no explanation as to why or where in the circulatory system this is occurring.

ResultsPlus
Examiner Tip

Learn the events occurring in each component of the circulatory system.

In region 4, is the blood capillaries. The blood pressure got lower since nutrients need to be diffused into the cells and it got further from the heart. Arteries have higher blood pressure than capillaries. The blood pressure got lower because at the heart, blood needs to be pumped to the whole body, so high blood pressure is needed but ~~for~~ capillaries, ~~does~~ don't need high blood pressure since its one cell thick and near the cells.

ResultsPlus
Examiner Comments

Whilst this candidate understood that this section is the capillaries and that pressure is low, there was no explanation as to why the line is smooth.

ResultsPlus
Examiner Tip

Learn the events occurring in each component of the circulatory system.

The blood pressure drops from around 45 to 20 in region 4. It is because the heart does not need high blood pressure to transport oxygenated blood to the organs inside body.

ResultsPlus
Examiner Comments

This is typical of the answers seen, just a reference to pressure drop with no explanation or statement as to which part of the circulatory system this might be.

ResultsPlus
Examiner Tip

Learn the events occurring in each component of the circulatory system.

Question 4 (a)

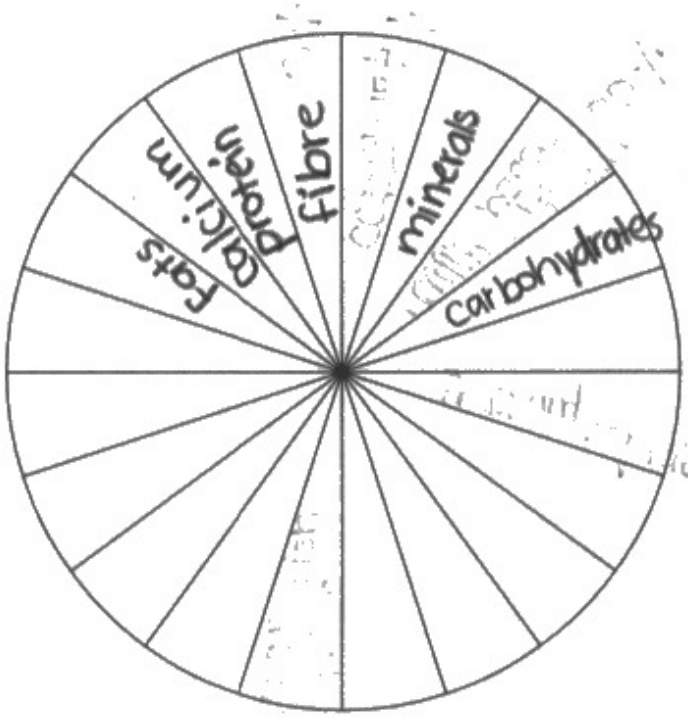
This was generally well answered though on occasions the keys that were provided to identify the segments were not always clear.

4 The table shows the percentage composition of the diets of two 10 year-old girls.

One girl lives in Area A and the other girl lives in Area B.

Component	Percentage (%) composition of diet	
	Area A	Area B
cereals	75.0	15.0
fruit and vegetables	15.0	37.5
eggs, fish and meat	2.5	27.5
milk, cheese and butter	7.5	20.0

(a) Complete the pie chart to show the diet of the girl in Area B.

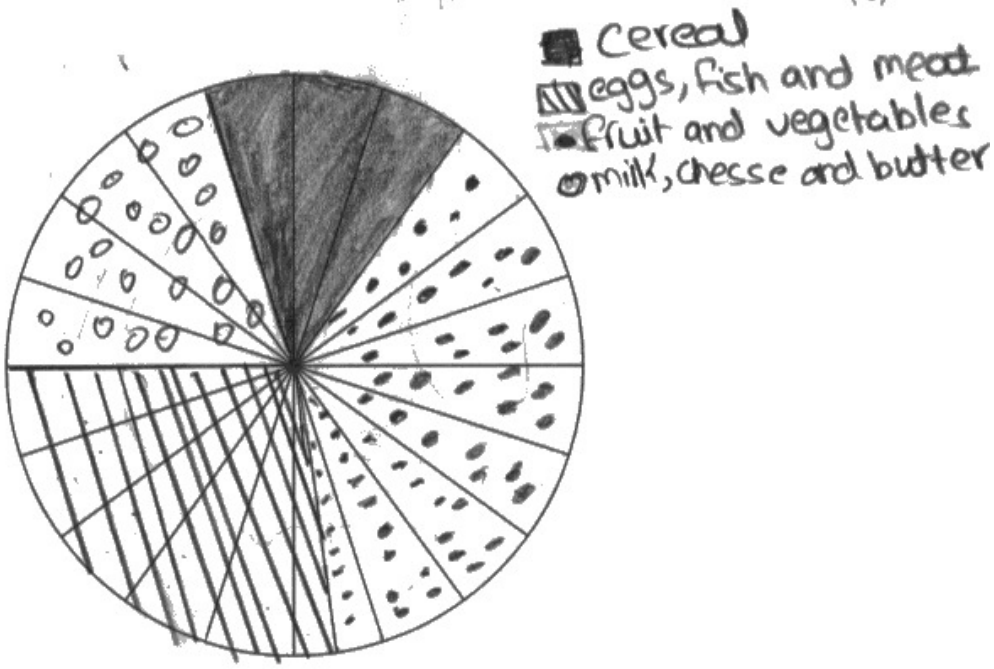


A poor answer which shows a complete lack of understanding of pie charts.

Practice drawing pie charts and remember to identify the segments with a suitable key.

(a) Complete the pie chart to show the diet of the girl in Area B.

(4)



ResultsPlus
Examiner Comments

A good answer with a clear key.

ResultsPlus
Examiner Tip

Practice drawing pie charts.

Question 4 (b)

Many candidates chose to describe a balanced diet by listing all of the components. This is not ideal as a definition but if there were sufficient components in the list this was accepted. Many candidates failed to mention that the components had to be in the correct amounts.

(b) Explain what is meant by a balanced diet.

(2)

A balanced diet is a diet that contains the correct proportions of all the nutrients. A balanced diet must contain water, vitamins, fibre, proteins, carbohydrates, fats and minerals.

ResultsPlus Examiner Comments

Correct reference to proportions and lists the contents of a balanced diet.

ResultsPlus Examiner Tip

Consider whether it better to express the answer in prose rather than giving a list.

A balanced diet is a diet with healthy amount of nutrients for a person to consume.

ResultsPlus Examiner Comments

A vague answer that received no credit.

ResultsPlus Examiner Tip

Learn definitions.

Question 4 (c)

A simple ratio calculation that did not cause many problems. A few candidates managed to get the ratio the wrong way round.

(c) Calculate the ratio of the percentage composition of cereals in the diet of the girl in Area A compared with the diet of the girl in Area B.

Give your answer in the form n : 1

$n = \frac{75}{15} = 5$

n : 1
75 : 15

ratio = 5 : 1

ResultsPlus
Examiner Comments

Even though it was a relatively straightforward calculation this candidate set out their working so it was clear how they had reached the final answer.

ResultsPlus
Examiner Tip

Set out workings for any calculation.

Question 4 (d)

This question caused a few problems, often because of poor expression of the answer. Many candidates failed to mention that the foods mentioned contain a lot of protein and therefore girl A would be taking in lower levels of protein. This was the basis for any answer and the results of low protein intake would follow on with a final reference to Kwashiorkor.

(d) Discuss the effects that the percentage composition given for eggs, fish and meat in the diet may have on the growth of the two girls.

(5)

~~The girl in Area A has a consumes a diet which consists of 2.5% eggs, fish and meat. Eggs, fish and meat of 7.5% of milk cheese and butter. Milk, cheese and butter are rich sources of lipids~~

The percentage composition of eggs, fish and meat ~~if~~ of the girl in area A is 2.5%. which is fairly low. Eggs, fish and meat are a good source of protein. Protein is essential in our diet as it is used for many different things such as growth and repair of muscles, to create structural proteins such as keratin and to create proteins with a more specific function such as haemoglobin. Without adequate protein, the girl in area A may ~~not~~ develop kwashiorkor, have poor muscle development and flaky skin. She may become weak and have poor growth overall. The girl in Area B has a ~~3 higher protein 12.5%~~ diet which contains 12.5% more eggs, fish and ~~but~~ meat. This means that her diet is rich in protein and she will show ~~normal~~ better growth.

(Total for Question 4 = 13 marks)

A good answer which sets the context and then follows on with a sequential account of the effects of the low protein intake, clearly written.

Write answers to these longer questions in rough first and then sort the order and flow of the question for the actual write up on the paper.

In the diet of girl in Area A, it has more ~~ee~~ cereals so it would provide calcium needed for the bone strength, preventing rickets and osteoporosis. However, the diet of girl in Area B has higher fruit and vegetables which is the source of vitamin c so it would prevent ~~so~~ scurvy and could make connetive tissues Also, ~~it~~ B has beges amount of eggs, fish and meat which provides lipid, vitamin D and protein. So these would be more growth and ~~bone or~~ could avoid kwashiorkor. The diet in Area B also has more milk, cheese and butter that provides vitamins and calcium. The girl in Area B also has a less chance of getting anaemia as it contains greater composition of egg which is also the source of ~~anaemia~~ iron.

ResultsPlus
Examiner Comments

This answer never really gets to the heart of the point which is the deficiency of protein and its subsequent effects. It goes in a number of directions which are not relevant.

ResultsPlus
Examiner Tip

Write answers in rough first and then sequence when writing on the exam paper.

Eggs, fish and meat are sources of calcium, vitamin D, protein, ~~and~~ iron and vitamin B2. Calcium can be used for bone growth and for compact bone. Vitamin D helps with the absorption of calcium. Vitamin B2 helps with cellular respiration. Iron ~~makes~~ sure helps with formation of haemoglobin which transports oxygen to the body for ~~resp~~ aerobic respiration. This makes sure more energy ~~muscles~~ is sent to muscle tissues hence more growth. Protein can be broken down to amino acids of tRNA which will then produce different proteins with different shapes and functions. This makes sure enzymes, haemoglobin, antibodies and hormones for homeostasis and development are produced. More enzymes mean more chemical (metabolic) reactions can occur. Girl in area A has 2.5% of eggs, fish and vegetable which is 25% less than girl in area B. Girl in area B would have more of properties mentioned above and would grow more.

(Total for Question 4 = 13 marks)

ResultsPlus
Examiner Comments

This answer doesn't really focus on the question asked, it is simply a discourse on diet without any real direction.

ResultsPlus
Examiner Tip

Write answers in rough first and then sequence when writing on the exam paper.

Question 5 (a)(i)

This was a question based on a practical investigation and it appeared that many of the candidates may not have performed a similar investigation in the classroom. The points should have been quite simple in that the resting conditions needed to have returned before the next phase of the investigation.

5 A student uses this method to investigate the effect of exercise on the production of sweat.

- place a person in a room which has a temperature of 20 °C
- ask the person to remain inactive for 5 minutes
- measure the amount of sweat produced by a 25 cm^2 area of skin
- ask the person to exercise and measure the amount of sweat produced
- ask the person to rest for 10 minutes

Repeat the method at room temperatures of 22 °C, 24 °C, 26 °C, 28 °C and 30 °C

(a) (i) Explain why the person rests for 10 minutes before the method is repeated.

(2)

to avoid anomalies and maintain accuracy
to make sure heart rate is normal
to ensure validity

ResultsPlus
Examiner Comments

The return of the heart rate to normal is acceptable but references to anomalies is not valid or ensuring validity.

ResultsPlus
Examiner Tip

If it is not possible to perform the investigations given in the specification then read up about them so there is an understanding.

Person rests in order for breathing rate and heart rate to drop, which is paying for the oxygen debt as lactic acid is produced

ResultsPlus
Examiner Comments

The answer would have been improved if the candidate had added return to normal after heart rate and breathing rate or return to resting values but the correct ideas were conveyed. References to lactic acid were not helpful.

ResultsPlus
Examiner Tip

Ensure full answers are given.

Question 5 (a)(ii)

The majority of candidates are familiar with the idea of control variables and were able to score well on this question.

(ii) State three variables that should be controlled.

1 same clothes

2 same type of ~~exercise~~ exercise

3 same time length of exercise

ResultsPlus
Examiner Comments

A good clear answer setting out three relevant variables to be controlled.

ResultsPlus
Examiner Tip

Always indicate that the variable is to be kept the same and don't just list variables such as clothes, time etc.

1 intensity of exercise

2 water intake of the person as well humidity and wind in the room

3 clothing material of the person

ResultsPlus
Examiner Comments

This answer could have been improved by stating that the clothes of the person should remain the same and that the intensity of the exercise should remain constant.

ResultsPlus
Examiner Tip

Be clear what is meant ie does something remain the same or does it change.

Question 5 (b)(i)

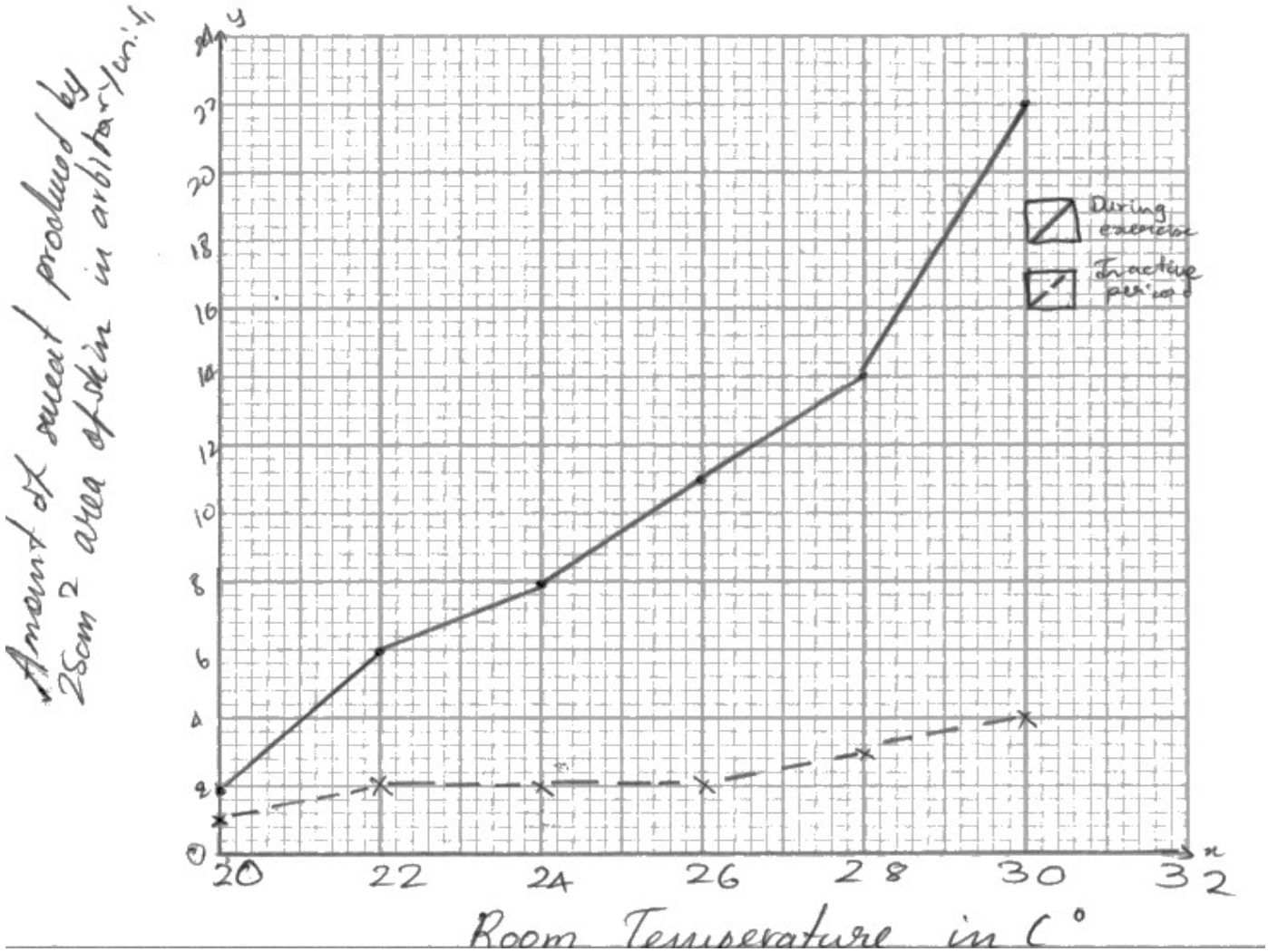
The plotting of graphs can be very variable. Some candidates failed to identify which line was which and some failed to draw lines using a sharp pencil and a ruler. Straight lines can't be drawn freehand. Occasionally axes were not labelled.

(b) The table shows the student's results.

Room temperature in °C	Amount of sweat produced by 25 cm^2 area of skin in arbitrary units	
	While inactive	During exercise
20	1	2
22	2	6
24	2	8
26	2	11
28	3	14
30	4	22

(i) Plot line graphs of the student's results.

Join the points with straight lines.

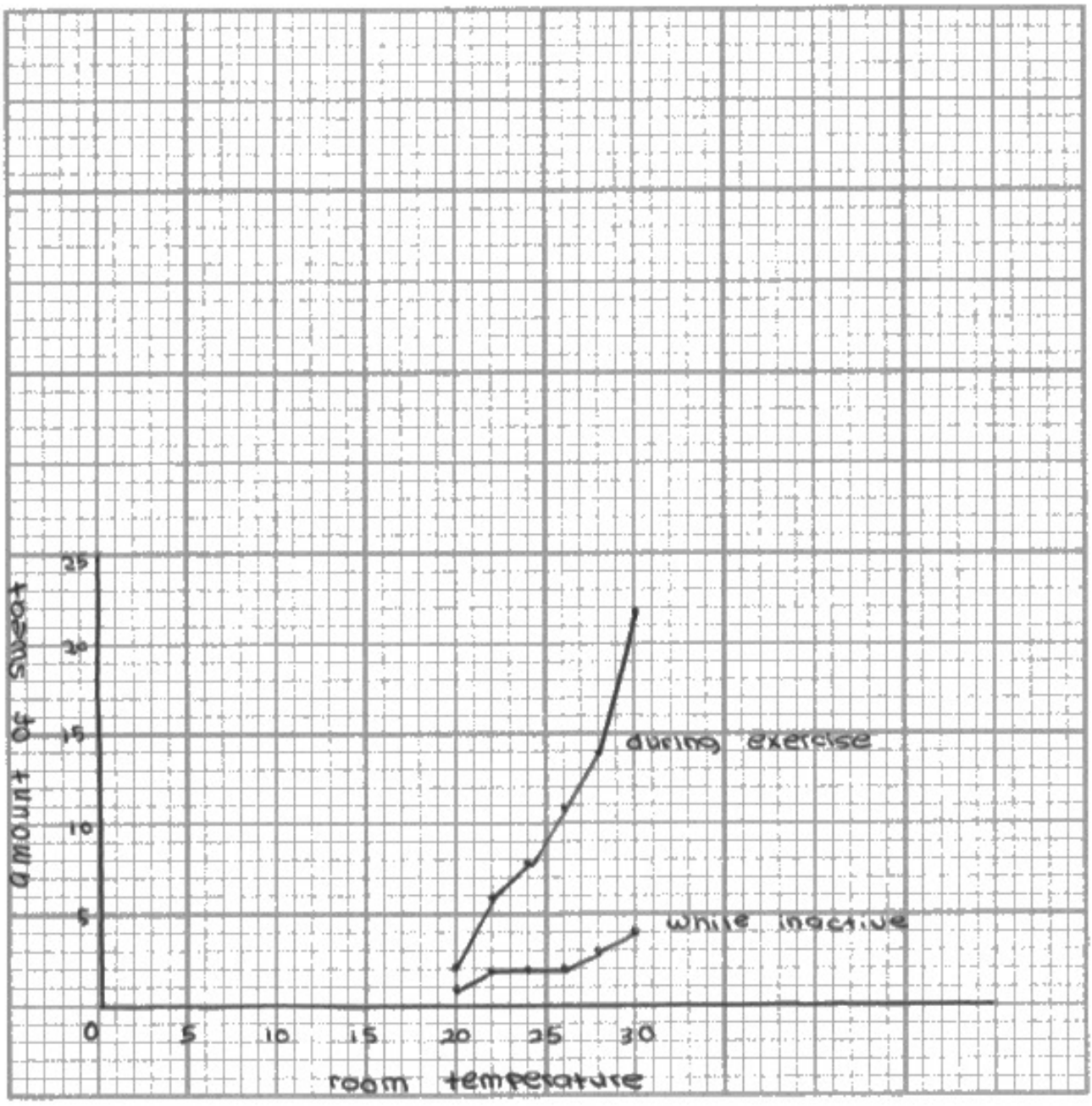


ResultsPlus
Examiner Comments

An excellent well drawn graph using the whole of the graph paper with the axes clearly labelled and the plots identified.

ResultsPlus
Examiner Tip

Always use a sharp pencil and ruler.



ResultsPlus
Examiner Comments

A totally inappropriate scale which made it impossible to check whether the points had been plotted correctly.

ResultsPlus
Examiner Tip

Use as much of the graph paper as possible whilst at the same time applying a sensible scale.

Question 5 (b)(ii)

(ii) Explain the differences between the two sets of results.

(5)

When the person exercises, more respiration takes place to generate more energy for the muscles to contract to carry out the exercise. Respiration produces heat energy as well. This causes body temperature to rise. The ~~lungs~~ brain detect this change and sends ~~of~~ signals to nerves connected to the sweat glands to produce more sweat ~~to~~ This removes latent heat when sweat evaporates, to prevent body temperature to get too high. This ~~which~~ prevents ~~can cause~~ the enzymes carrying out metabolic processes in the body to denature.

ResultsPlus
Examiner Comments

This is an excellent concise and well-constructed answer that includes all of the points in a logical sequence.

ResultsPlus
Examiner Tip

Longer answers should be planned separately off the exam paper and then put together in a logical order.

At temperature 20 during excersise ~~is more~~ sweat is more At temperature ~~22~~ 22 during excersise sweat doubles than at inactive. At temperature 24 during excersise sweat icreases more while at inactive sweat is same at temperature 22 and 24 and 26. At temperature 26 during excerise there is huge difference between sweat during excersise and in active. At temperature 30 during excersise there is highest sweat and while inactive it is also highest sweat. At temperature there is lower stress for both excersise and inactive. But is higher than inactive

ResultsPlus
Examiner Comments

This candidate is saying little. All the answer covers is that sweating increases with room temperature. Endless quoting of figures from the table does nothing by way of answering the question.

ResultsPlus
Examiner Tip

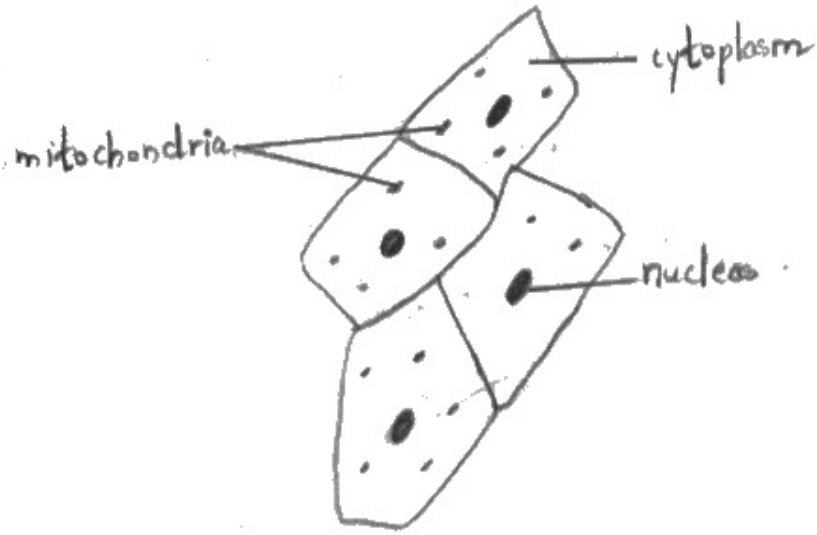
Whilst sometimes it is useful to quote a set of figures, just repeating figures from the table is not answering the question.

Question 6 (a)

The vast majority of diagrams were very poor and bore no resemblance to an actual cheek cell in terms of shape or position of nucleus. Many diagrams included structures that could not possibly be seen using a light microscope.

6 The lining of the inside of the cheek is made of squamous epithelial cells.

(a) Draw a labelled diagram to show a cheek cell when seen using a light microscope

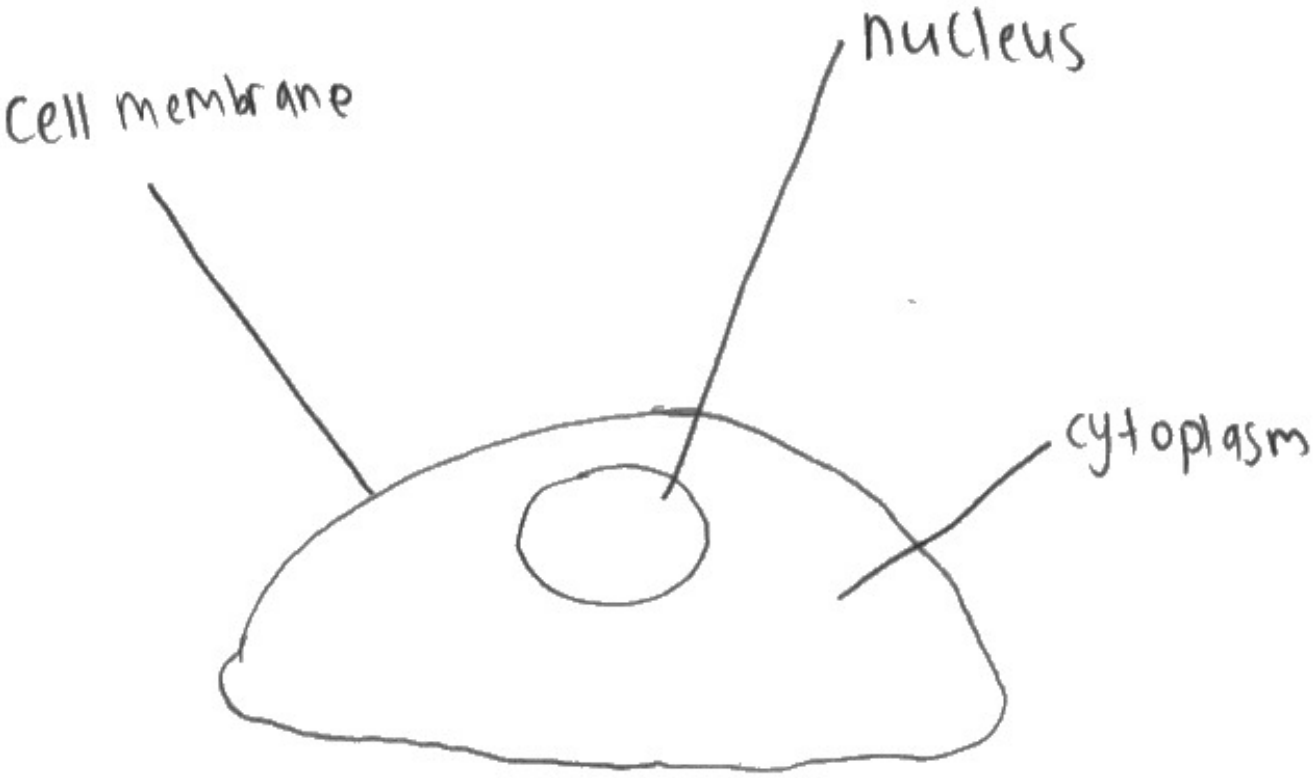


ResultsPlus
Examiner Comments

Although the question asks for one cell to be drawn candidates were not penalised for drawing more than one. This candidate has the approximate shape of cheek cells but has included the label of mitochondria which could not be seen using a light microscope.

ResultsPlus
Examiner Tip

Practice drawing examples of cells that are mentioned in the specification.



ResultsPlus
Examiner Comments

This diagram just scored the diagram mark though the shape of the cell leaves a little to be desired as does the size of the nucleus. However, it is a rough approximation to what an actual cheek cell might look like and the labels are correct.

ResultsPlus
Examiner Tip

Practice drawing cells.

Question 6 (b)

(b) Describe how a sample of cheek cells would be prepared to view using a light microscope.

(3)

Place the sample on the ~~slip~~ strip. Adjust the lens of microscope and put stain on the ~~specim~~ specimen

ResultsPlus
Examiner Comments

A mark was allowed for a reference to staining. We were unsure what the candidate meant by a strip.

ResultsPlus
Examiner Tip

Learn the correct names for pieces of equipment.

~~the microscope~~ Use a spatula and scrape the cheek of the person. Transfer the cells from the spatula to a the transparent microscope slide. Drop coloured dye on the slide to make ~~to get~~ the cells visible under a microscope.

ResultsPlus
Examiner Comments

Most of the detail is to be found in this answer. Learn to read and to follow the sequence of events which are correct.

ResultsPlus
Examiner Tip

Use the correct terms for scientific apparatus.

Question 6 (c)

This was a comparison question and statements such as 'cells in trachea have cilia' were all too common without any reference to cheek cells not having any. Many candidates discussed the presence of goblet cells which is not relevant as they are separate cells in the trachea. Few candidates mentioned the different position of the nucleus.

(c) State three differences between a cheek cell and a cell from the lining of the trachea.

(3)

1 A cheek cell is a squamous epithelial cell where as the cell in the lining of trachea is a ~~fitti~~ ciliated cell.

2 The ~~it~~ cell in the lining of the trachea has hair ~~like~~ like structures whereas a cheek cell does not.

3 Cheek cells are stacked on top of one another whereas the cells in lining of the trachea is ~~arrag~~ arranged in columns beside ~~each~~ one another.

(Total for Question 6 = 10 marks)

ResultsPlus
Examiner Comments

This candidate scores a mark for a correct reference to the presence and absence of cilia but nothing else is relevant.

ResultsPlus
Examiner Tip

Express answers clearly using correct terminology.

1 lining cell of trachea ~~has~~ is ~~cell~~ ciliated but cheek cell is not.

2 lining cells have a more rectangular long shape where cheek cells are round and

3 shapeless. / 3. lining cell does not contain ~~vacuoles~~ & nucleus.

ResultsPlus
Examiner Comments

The first two points here are correct with clear comparisons made but the third point seems to be trying to say something similar to the point made in 2.

ResultsPlus
Examiner Tip

Make sure answers are distinct and covering separate points when asked for comparisons.

Question 7 (a)(i)

7 The four blood groups that occur in humans are group A, group B, group AB and group O.

There are three blood group alleles: I^A, I^B and I^O.

I^O is recessive to both I^A and I^B.

I^A and I^B are co-dominant to each other.

(a) (i) Explain what is meant by the term **co-dominant**.

(2)

This is where, two dominant alleles are present and both their phenotypes are expressed.

ResultsPlus
Examiner Comments

This is a good answer with a clear statement that both alleles have to be present and both are expressed.

ResultsPlus
Examiner Tip

Learn definitions of terms in genetics using the correct phraseology.

- They cannot transfuse or donate blood to eachother.

ResultsPlus
Examiner Comments

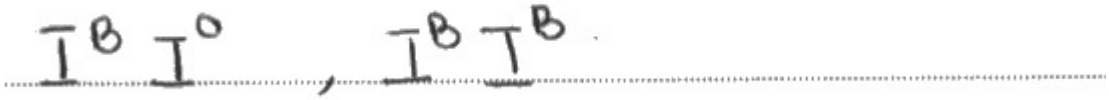
This answer has nothing to do with the question and it is difficult to understand where the candidate has obtained their ideas from.

ResultsPlus
Examiner Tip

Check the context of a question before committing to an answer.

Question 7 (a)(ii)

(ii) State the possible genotypes of a person with blood group B.



ResultsPlus
Examiner Comments

This response was typical of the answers seen.

ResultsPlus
Examiner Tip

Ensure with genotypes for blood alleles that the prefix is always used.

Question 7 (b)

This was generally well answered. Common omissions were no reference to it being recessive or being carried on the X chromosome.

(b) Haemophilia is a sex-linked condition that prevents the blood clotting.

Explain why males are more likely to be affected by haemophilia than females.

As haemophilia is a recessive allele and males ~~have~~ are XY while females are XX so they are more at risk due to contains a recessive allele so disease is more likely affects males

ResultsPlus Examiner Comments

Here there is no reference to the allele being carried on the X chromosome or that only females can be carriers which is a pity because this candidate made a very good start to the answer.

ResultsPlus Examiner Tip

The mark allocation should always be noted and answers should be given in sufficient detail to justify all of the marks.

- It's passed on by genetics from parent men are more likely to have unsafe sex more than females.

ResultsPlus
Examiner Comments

This answer makes a sweeping statement about males which has nothing to do with the transmission of haemophilia.

ResultsPlus
Examiner Tip

Read the question carefully to ensure that the answer matches the one set.

two x-chromosome ~~they~~ can. Haemophilia is an x-linked condition that ~~has a~~ affect the recessive allele. Females has two x chromosome that inherit either X^h or X^H. Females that are affected by haemophilia can only have the allele of $X^h X^h$ not $X^H X^h$ or $X^H X^H$ thus reducing the ~~a~~chance of being affected whilst male only has one x chromosome that can inherit. This makes males more likely to be affected because they can't be a carrier.

ResultsPlus
Examiner Comments

Whilst this answer may not be as clear as the Examiners would have liked to see, it nevertheless makes all the relevant points and therefore can be awarded full marks.

ResultsPlus
Examiner Tip

Set out answers in rough first and then transfer to the exam paper in a logical order.

Question 8 (a)(i)

This question was generally well answered with many candidates correctly identifying all three components.

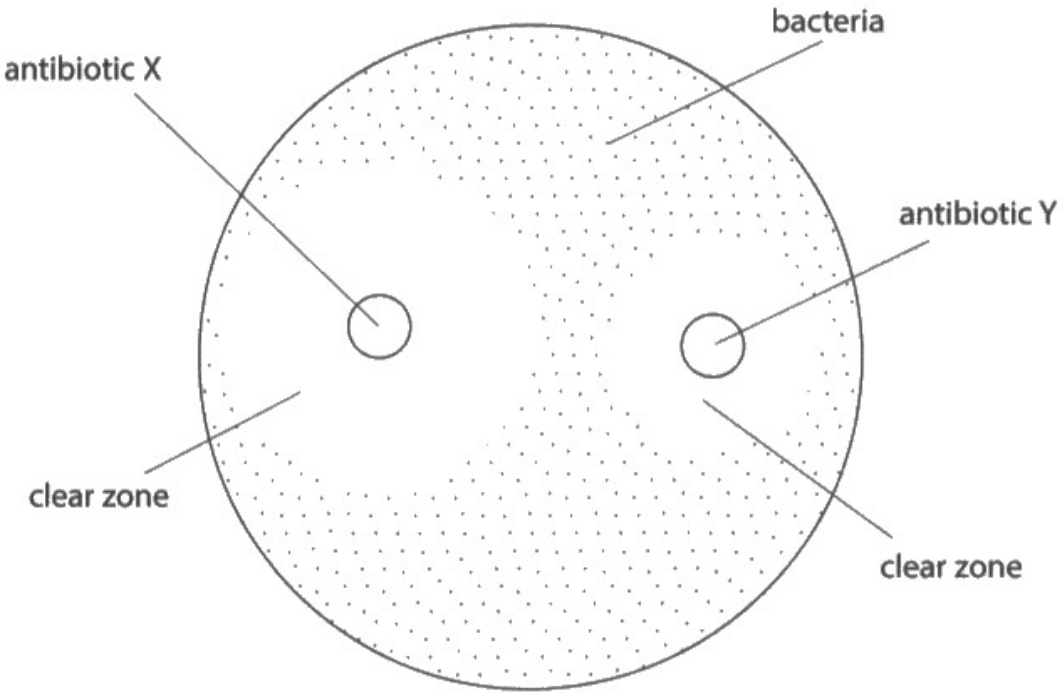
Question 8 (a)(ii)

The answer was usually correct though some candidates gave bacteria or viruses rather than the term pathogen.

Question 8 (b)(i)

(b) A student uses this method to investigate whether antibiotic X is more effective than antibiotic Y.

- grow bacteria on nutrient agar in a Petri dish
- soak one disc of filter paper in antibiotic X and another disc in antibiotic Y
- place each disc on the agar in the Petri dish
- seal the Petri dish and leave for three days



(i) Describe what is meant by the term **antibiotic.**

(2)

~~It's produced by lymphocytes allows it to kill~~ ~~bacteria and pathogen enters the body.~~

It's a * chemical that's used to kill bacteria and allow antigens and antibodies to be produced, and ~~allows~~ allow the bacteria to be in one place so it will be killed easily.

ResultsPlus
Examiner Comments

This answer is typical of the ones seen where there is a correct reference to killing of bacteria but then a discussion of antibodies and antigens, suggesting that the candidate had not read the question carefully enough.

ResultsPlus
Examiner Tip

Read the question carefully and answer the one that has been set.

Question 8 (b)(ii)

Whilst candidates recognised that the more effective of the two would have a larger clear/inhibition zone around it, they failed to state that the antibiotic diffused from the disc into the agar.

(ii) **Explain which antibiotic, X or Y, is more effective against the bacteria in the Petri dish.**

(3)

X is more effective because there is a clear zone of greater diameter around the antibiotic disc. This proves that bacteria has been killed and there are no bacteria in clear zone.

ResultsPlus
Examiner Comments

This is typical of answers where there is no reference to the diffusion of the antibiotic out of the disc.

ResultsPlus
Examiner Tip

Give full answers.

Antibiotic X is more effective because ~~it has more radius than the a~~ the clear zone of X is bigger than the clear zone of Y. That means ~~x~~ antibiotic X ~~p~~ can prevent more bacteria than the antibiotic Y.

ResultsPlus
Examiner Comments

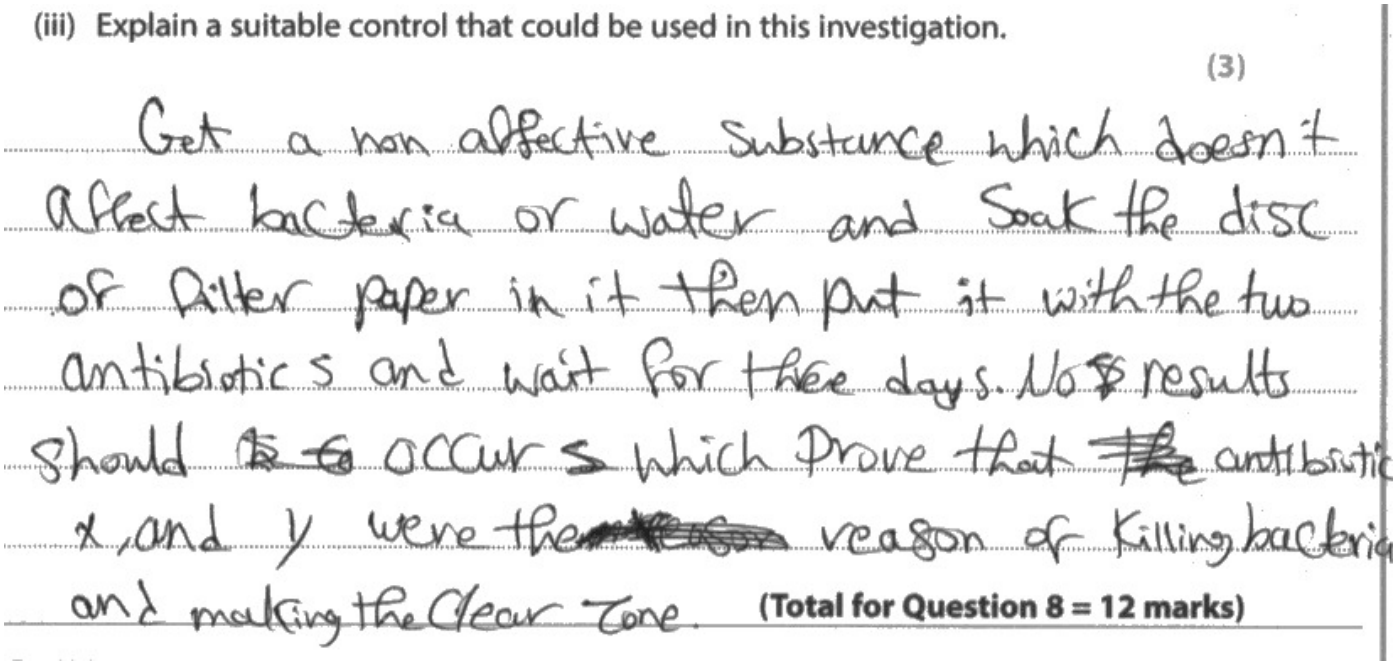
There is not enough for two marks here. There is a correct reference to a larger clear zone around the more effective antibacterial agent but the candidate has not said that is because they have been killed.

ResultsPlus
Examiner Tip

Write full answers. A three mark allocation means that three relevant points have to be made.

Question 8 (b)(iii)

This was a poorly answered question. Whilst some candidates correctly made the point that it would be possible to set up a control using discs soaked in water, they were unable to express clearly how the control would be used to prove that it was the antibacterial agents that were causing the clear zones.



(iii) Explain a suitable control that could be used in this investigation.

(3)

Get a non affective substance which doesn't affect bacteria or water and soak the disc of filter paper in it then put it with the two antibiotics and wait for three days. No results should occurs which prove that antibiotic x and y were the reason of killing bacteria and making the clear zone.

(Total for Question 8 = 12 marks)

ResultsPlus
Examiner Comments

The answer is not completely clear at the beginning but it gives the correct ideas of a disc soaked in water and the results being compared to see whether there was a clear zone around it and if not the conclusion must be that it is the agents causing the clear zone.

ResultsPlus
Examiner Tip

Always read an answer after it has been written to make sure that it is clear to someone else reading it.

- control the temperature.
- After soaking the disc, pick it up using sterilize equipment.
- Use gloves to avoid the ~~bacteria~~ bacteria on your hands contaminating.

ResultsPlus
Examiner Comments

This candidate has completely missed the point. The question is not about control variables but about a control experiment, there is a big difference and candidates need to be aware.

ResultsPlus
Examiner Tip

Ensure that you understand the difference between a control and control variables.

Paper Summary

Based on their performance on this paper, candidates should:

- Ensure that the workings for all calculations are shown.
- Show workings in a logical sequence.
- Always write in clear, full sentences.
- Focus answers on the question asked and avoid writing down everything known about a topic.
- Ensure that even if they have not had the facility to carry out practical work in a laboratory situation that they have gone through the stages of a practical so that they are able to describe an experiment.

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