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Examiners' Report
June 2011

GCE Biology 6BI01 01

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June 2011

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Introduction

This was the sixth 6BI01 paper and it was really good to see that the previous papers and mark schemes have been used to prepare for this exam. There were a couple of questions testing parts of the specification that have not been covered in previous papers, but in general students attempted to answer these questions well.

The two sets of multiple choice questions 2(b) (i) (ii) (iii) and 6(c) (ii) (iii) scored very well. On average, almost three quarters of the candidates were getting the correct answers to the three 2(b) and a slightly higher percentage answered 6(c) questions correctly as shown in the table below.

Question	Percentage of correct responses
Q02bi	77.3%
Q02bii	74.4%
Q02biii	75.4%
Q06cii	83.6%
Q06ciii	78.7%

Regrettably, an error was identified on question 6(c)(i), on page 21 of the question paper on the day of the exam. We sincerely apologise that this error was not picked up before the exam.

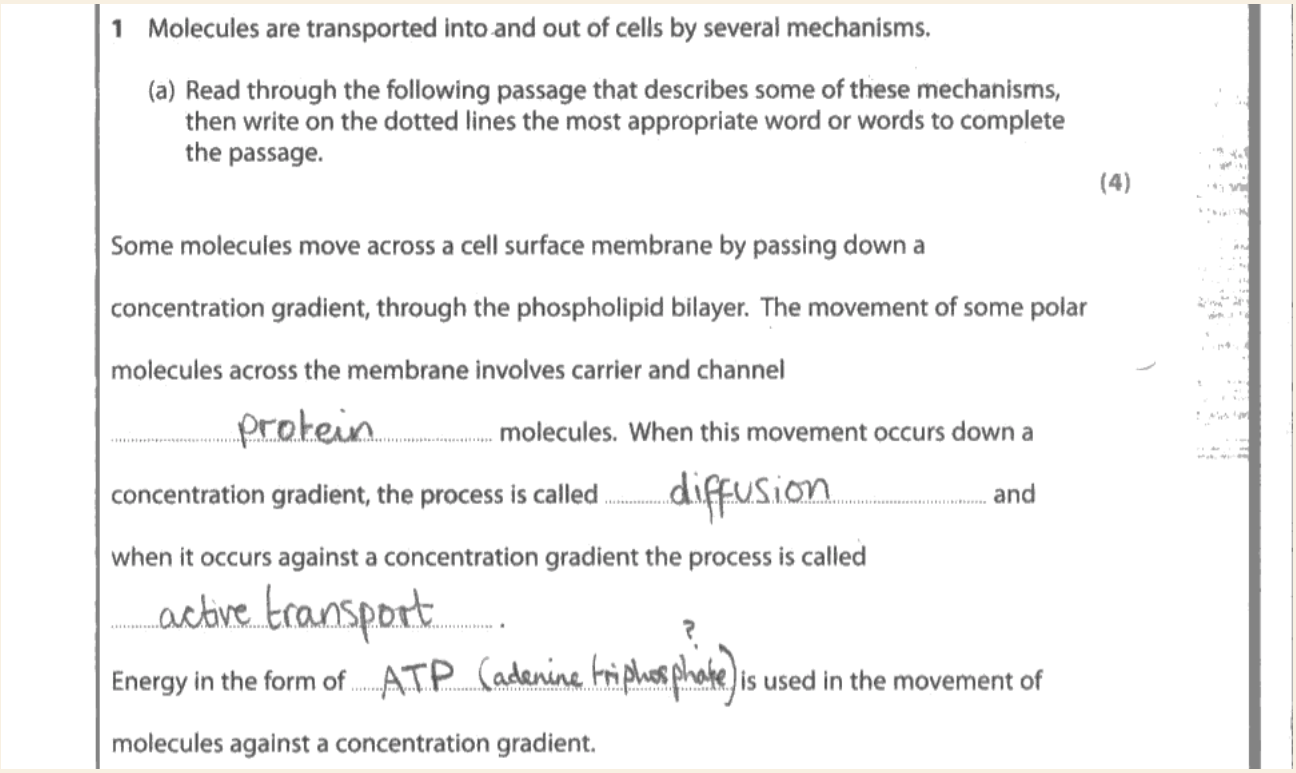
All students have been scored as '0' for this question, and the total raw mark for the paper has been reduced by 1 mark from 80 marks to 79 marks. The marking of this question paper is complete and we now understand how students have performed both before and after Question 6c(i). For each individual student we have considered how they performed before and after the affected question on the paper, the estimated grades from their teacher and their performance in the other GCE Biology units they had sat with us. Adjustments were made to a small number of candidates' marks as a result of these checks. The schools and centres with affected students were notified during the week of 8 August 2011.

Overall, there were some extremely good answers for questions covering topics that have been previously tested and many of the candidates are clearly more familiar with the recommended core practicals. A number of candidates were scoring the maximum of five marks for question 7b.

Question 1 (a)

This was generally a high-scoring question, despite an unfamiliar context for assessing knowledge and understanding of osmosis and the properties of water. As we have seen in previous papers, students find calculating percentage changes very difficult and this was no exception. However, the majority attempted the question and scored at least the first marking point.

A straightforward question to start the paper with, but many candidates only scored three marks as they were not specific enough in their answer to the second blank. This response is typical of many that we saw where answers simply stated diffusion and did not qualify it as facilitated diffusion.



1 Molecules are transported into and out of cells by several mechanisms.

(a) Read through the following passage that describes some of these mechanisms, then write on the dotted lines the most appropriate word or words to complete the passage.

(4)

Some molecules move across a cell surface membrane by passing down a concentration gradient, through the phospholipid bilayer. The movement of some polar molecules across the membrane involves carrier and channel protein molecules. When this movement occurs down a concentration gradient, the process is called diffusion and when it occurs against a concentration gradient the process is called active transport.

Energy in the form of ATP (adenine triphosphate) is used in the movement of molecules against a concentration gradient.

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Examiner Comments

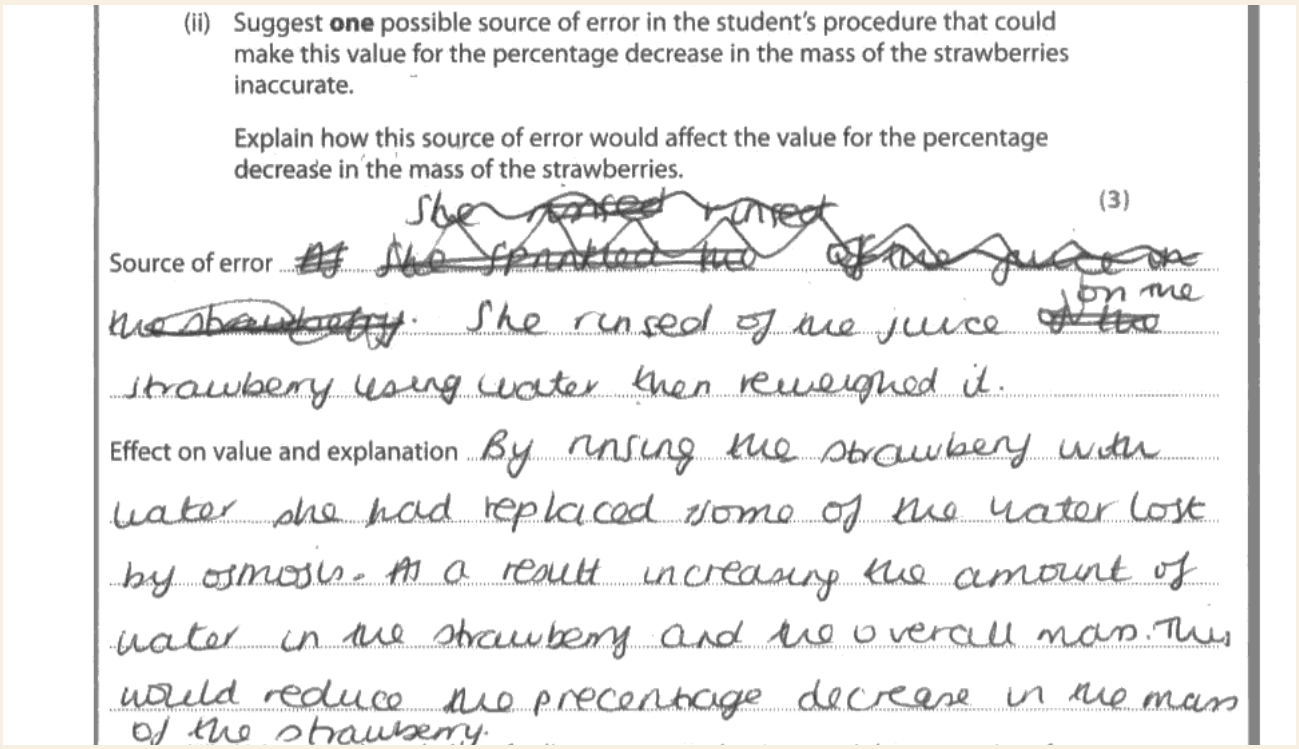
Candidates are expected to be familiar with the terms and names of processes referred to in the specification and consequently their answers should show an appropriate level of detail. Candidates can use abbreviations in their answer if we have used them in the specification, without attempting to write them out in full. In this example we ignored the incorrect attempt to give ATP in full, however this would not have been possible if ATP had not been written as well.

ResultsPlus
Examiner Tip

Only use abbreviations if we have used them in the specification, do not invent your own.

Question 1 (b) (ii)

There were some very good attempts at this question, although there were some candidates who had clearly not read the question through carefully and offered us a source of error as not rinsing the strawberries before weighing them. We did award consequential error marks for candidates who did not give us reasonable sources of error but correctly told us the subsequent effect that it would have on the mass and the percentage decrease.



(ii) Suggest **one** possible source of error in the student's procedure that could make this value for the percentage decrease in the mass of the strawberries inaccurate.

Explain how this source of error would affect the value for the percentage decrease in the mass of the strawberries.

(3)

Source of error She ~~rinsed~~ rinsed ~~the strawberry~~ She rinsed of the juice on the strawberry using water then reweighed it.

Effect on value and explanation By rinsing the strawberry with water she had replaced some of the water lost by osmosis. As a result increasing the amount of water in the strawberry and the overall mass. This would reduce the precentage decrease in the mass of the strawberry.

ResultsPlus
Examiner Comments

In this response, there is insufficient information to award the first mark point at the top, as the candidate has only repeated part of the information given in the question. However they go and suggest that water could reenter the strawberry, scoring all three marks.

ResultsPlus
Examiner Tip

Be careful to not simply repeat information that we have given in the question without elaborating on it.

In questions asking about sources of error in results we expect the equipment to have been used properly and the stated procedure to have been followed. Therefore comments on these are no appropriate sources of error.

(ii) Suggest **one** possible source of error in the student's procedure that could make this value for the percentage decrease in the mass of the strawberries inaccurate.

Explain how this source of error would affect the value for the percentage decrease in the mass of the strawberries.

(3)

Source of error: Incorrect mass readings

Effect on value and explanation: This would significantly change the value of the mass and change the value of the percentage decrease.

ResultsPlus
Examiner Comments

This response did not score any marks. The source of error given was not credit-worthy and the vague reference to 'changes' in mass and percentage decrease could not be considered as consequential error marks.

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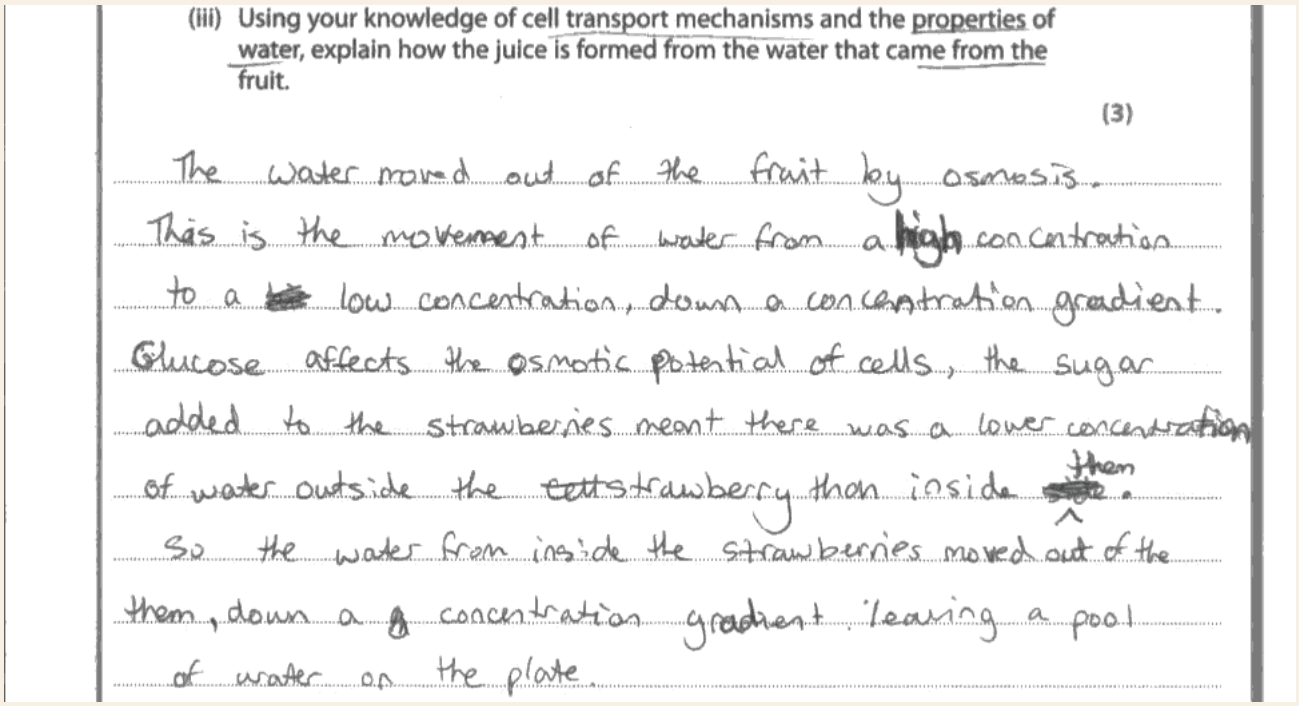
Examiner Tip

If you are refering to changes occuring, always be specific and say what these changes are, e.g. go up or go down.

Question 1 (b) (iii)

Responses were variable depending on whether or not the candidate had read the question and used their knowledge of both transport mechanisms and properties of water.

As in previous papers, candidates need to be clear which molecule is being refered to when discussing concentration gradients. A number of candidates did not do this and could not be awarded the first marking point.



(iii) Using your knowledge of cell transport mechanisms and the properties of water, explain how the juice is formed from the water that came from the fruit.

(3)

The water moved out of the fruit by osmosis. This is the movement of water from a high concentration to a low concentration, down a concentration gradient. Glucose affects the osmotic potential of cells, the sugar added to the strawberries meant there was a lower concentration of water outside the strawberry than inside them. So the water from inside the strawberries moved out of the them, down a concentration gradient leaving a pool of water on the plate.

ResultsPlus
Examiner Comments

In this response the candidate could not be awarded the first marking point until line 6 where they make it very clear that the water availability is lower on the outside of the strawberry.

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Examiner Tip

Always name the molecule that is in a high or low concentration. Only water moves by osmosis, no other molecule.

Question 2 (a) (i)

This was generally a high-scoring question, with candidates being able to apply their knowledge to the context of galactosaemia.

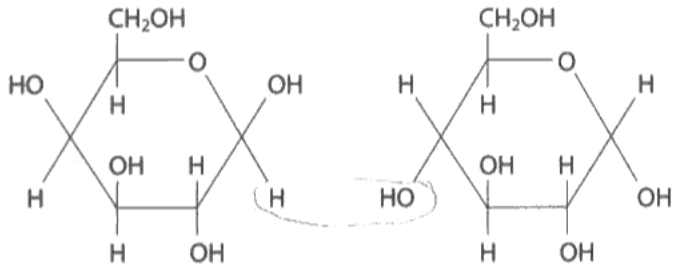
Candidates who knew how a glycosidic bond is formed were not phased by having to draw it between glucose and galactose, as opposed to two glucose molecules.

There were some very clear drawings of the galactose molecule and the water molecule

2 Galactosaemia is a genetic disorder that affects an individual's ability to metabolise the monosaccharide galactose.

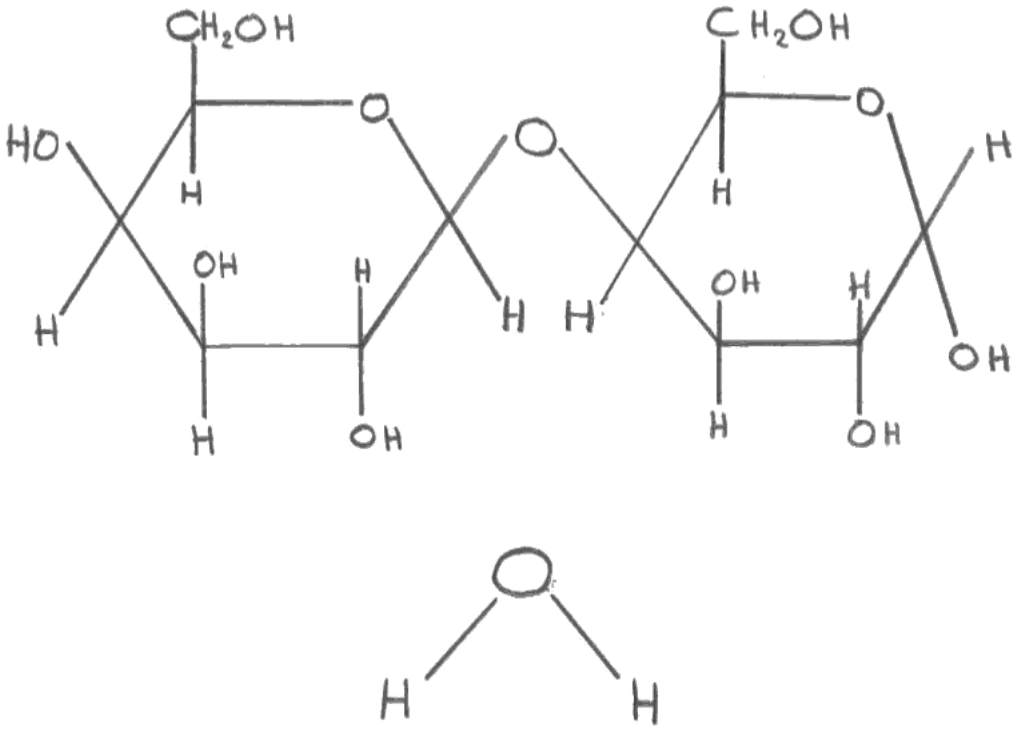
Dairy products contain the disaccharide lactose, which is broken down into galactose and glucose during digestion. If the galactose is not broken down further this may result in damage to the brain, kidneys or liver.

(a) The diagram below shows the structure of a galactose molecule and a glucose molecule.



(i) In the space below, draw a diagram to show the products formed when these two molecules join together to form lactose.

(3)



ResultsPlus
Examiner Comments

This candidate drew the displayed structure for water, but we accepted both H_2O or water stated.

ResultsPlus
Examiner Tip

In questions of this type do not just draw a circle around the H and an OH; always write that H_2O or water has been made.
Be very careful when copying out molecules in your answer to questions of this type - they must be drawn accurately so that no components are missing.

Question 2 (c)

Candidates dealt very well with the genetic cross in the unfamiliar context of galactosaemia.

Very few candidates scored the full four marks for part (i) as they omitted to write out the genotype of Sahan and Alina.

The majority of candidates knew that the probability of the second child being a carrier was identical to that of the first.

Consequential error marking was applied throughout this question to ensure that a mistake only cost the candidate one mark. We did expect the answer to part (ii) to be identical to the answer in part (i).

(c) (i) Use a genetic diagram to calculate the probability that Sahan and Alina's first child will be heterozygous (a carrier) if Sahan is heterozygous. (4)

Sahan - Gg Alina - GG

♂ / ♀	G	G
G	GG	GG
g	Gg	Gg

2 affected

2 carrier

Answer 2/4 , 50%

(ii) What is the probability that their second child would also be a carrier? (1)

It would be a 50% chance the 2nd child will also be a carrier.

ResultsPlus
Examiner Comments

This was one of very few answers where the candidate stated the genotype of the parents. Unfortunately it was often stated wrongly. This candidate could not be awarded the first marking point but the other three marks available to part (ii) were awarded, as they followed through their cross correctly with the given genotypes.

ResultsPlus
Examiner Tip

Remember to follow through the whole of the genetic cross and not just launch into drawing the Punnett square, as this gives the information carried in the gametes without stating the genotypes of the parents.

Question 3 (a)

We have not asked about the effect on the digestive system of Cystic Fibrosis before and were pleased to see some very good answers. There were some students who did not read the question properly and wrote about the effects on the respiratory system and there were others who had clearly seen the question in last summer's paper and described, in detail, how the abnormally thick mucus is produced.

The asterisk against this question indicates that QWC was assessed in the response to this question. Particular care should be taken with spelling, puntuation and grammar, as well as the clarity of expression, on these questions.

3 Cystic fibrosis is a genetic disease that can affect many body systems, including the digestive system. In a carrier of this disorder, preimplantation genetic diagnosis can be used to detect the presence of an allele for cystic fibrosis.

***(a)** Explain how cystic fibrosis affects the digestive system.

(4)

Normally digestive enzymes are sent from the pancrease to the duecdome through the pancreatic duct. However the thick mucus could build up in the tube therefore not allowing the digestive enzymes to go through. This has damaging effect as the 'food cannot be digested. This may lead to malnutrient as not enough food is being digested. Also if the digestive enzymes start to digest it may destroy cells in the body - if it destroys the cells that make insulin it may lead to diabetes.

ResultsPlus
Examiner Comments

This response scored the maximum four marks. The mis-spelling of pancreas on the second line prevented marking point 4 from being awarded but did not affect the awarding of marking points three, five, six, eight and nine. The second mark point was not given as mucus is normally thick and we need to know that it is abnormally thick in Cystic Fibrosis patients.

ResultsPlus
Examiner Tip

Look out for the two questions that have an asterisk against them and pay particular attention to your spelling and the clarity of your answer.
Always try to write more statements than there are marks, in case you cannot be awarded one of them.
Make sure if you are writing about mutations, that they are occuring in the genes and not in the protein.

Question 3 (b)

This question was poorly done, despite previous similar questions being asked about this in the past in the context of amniocentesis and chorionic villus sampling.

In previous questions on genetic diagnosis we have expected the candidate to state that the DNA is analysed and that the mutated CFTR gene is looked for

(b) Explain how **preimplantation** genetic diagnosis is performed to detect cystic fibrosis.

(3)

During In Vitro Fertilisation (IVF) treatment, many zygotes are produced. These are then allowed to grow. At a suitable stage, when at blastocyst stage, a cell is extracted and screened for mutations, faulty alleles that code for cystic fibrosis. Those that are affected are discarded and those that are unaffected are implanted or stored for later use - this process carries very little risk of harming foetus so is very safe.

ResultsPlus
Examiner Comments

This is a typical example of the reponses that we frequently saw for this question.The candidate was awarded the first marking point only.

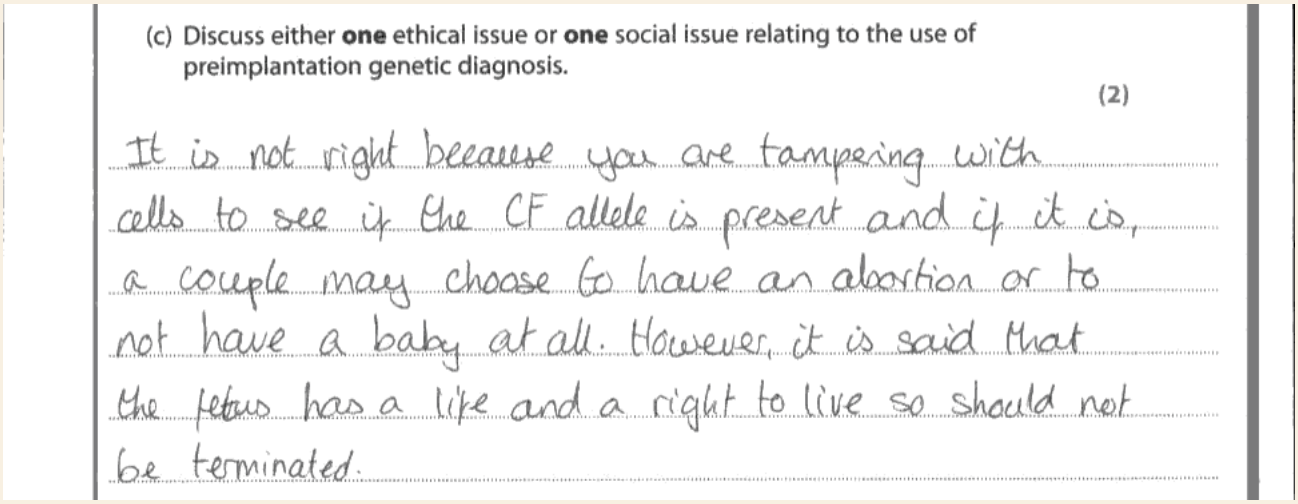
ResultsPlus
Examiner Tip

Look carefully at previous mark schemes to learn what we award marks for. Be careful to use correct terminology - a zygote is different from an embryo.

Question 3 (c)

This question was probably the worst answered of all questions on the paper. Despite the fact that we have asked questions about ethics before there were still numerous answers refering to designer babies and playing god.

A large proportion of candidates appeared to have forgotten the context of the question and made reference to abortion and miscarriages, voiding their answers.



(c) Discuss either **one** ethical issue or **one** social issue relating to the use of preimplantation genetic diagnosis.

(2)

It is not right because you are tampering with cells to see if the CF allele is present and if it is, a couple may choose to have an abortion or to not have a baby at all. However, it is said that the fetus has a life and a right to live so should not be terminated.

ResultsPlus
Examiner Comments

This is an example of the answer being given in the wrong context to award the marks, which is a shame as the candidate was trying to answer the question appropriately.

ResultsPlus
Examiner Tip

Always reread the question to make sure that your answer is in the correct context.

(c) Discuss either **one** ethical issue or **one** social issue relating to the use of preimplantation genetic diagnosis.

(2)

This diagnosis allows only healthy embryos to be implanted which means it may induce 'designer babies' to only be accepted. People will get to choose how they want their baby to be which means only designer babies will be accepted. All embryos whether or not they have a disorder should be able to develop into human beings as they could live a normal life and may not even have the disorder. By doing this, it is as if you are playing god and choosing how you want your baby

(Total for Question 3 = 9 marks)

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Examiner Comments

This is a typical of a large number of response to this question.

ResultsPlus
Examiner Tip

When discussing ethical issues, avoid terms such as 'playing god' and 'designer babies'

Question 4 (b)

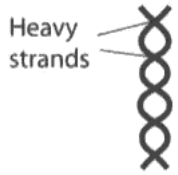
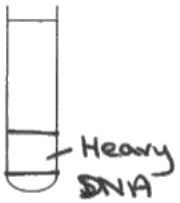
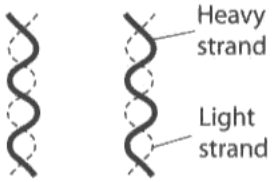
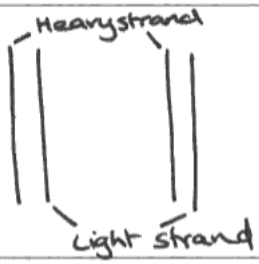
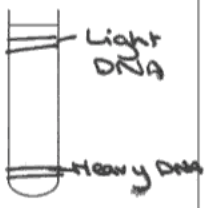
This is the first time that we have used Meselson and Stahl's experiment to test candidate's understanding of DNA synthesis. The majority of candidates did attempt to answer the question and some of the more able candidates coped very well and scored full marks.

The bands drawn in the test tubes in this response are typical of a number of answers that we saw by the weaker candidates. The strands of DNA drawn as two sets of parallel lines were not typical.

The table below summarises the three stages of Meselson and Stahl's experiment and their results.

Complete the table by drawing, in the appropriate boxes, diagrams of the DNA molecules and mark the position and size of the DNA bands in the tubes.

(6)

Experimental stage	Diagram to show the strands in the DNA molecules of the bacteria	Position and size of DNA bands in the tube of separating solution
Stage 1 Bacteria grown for several generations in culture medium containing heavy nitrogen		
Stage 2 The bacteria from the end of stage 1 were grown for another generation in culture medium containing light nitrogen		
Stage 3 The bacteria from the end of stage 2 were grown for one more generation in culture medium containing light nitrogen		

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Examiner Comments

Although the bands are in the wrong place in the tube in the bottom box, we applied a consequential error mark to marking point 6. This was only just awardable as the bands have been drawn rather carelessly and only just show that they are of the same width. Candidates should be encouraged to draw diagrams carefully

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Examiner Tip

When completing tables, whether with words, numbers or diagrams always look at the boxes that we have completed for clues as to what to do. We drew the DNA as a helix and represented the heavy and light strand as solid and dotted lines respectively - this is what the candidate should have done.

Question 5 (a) (i)

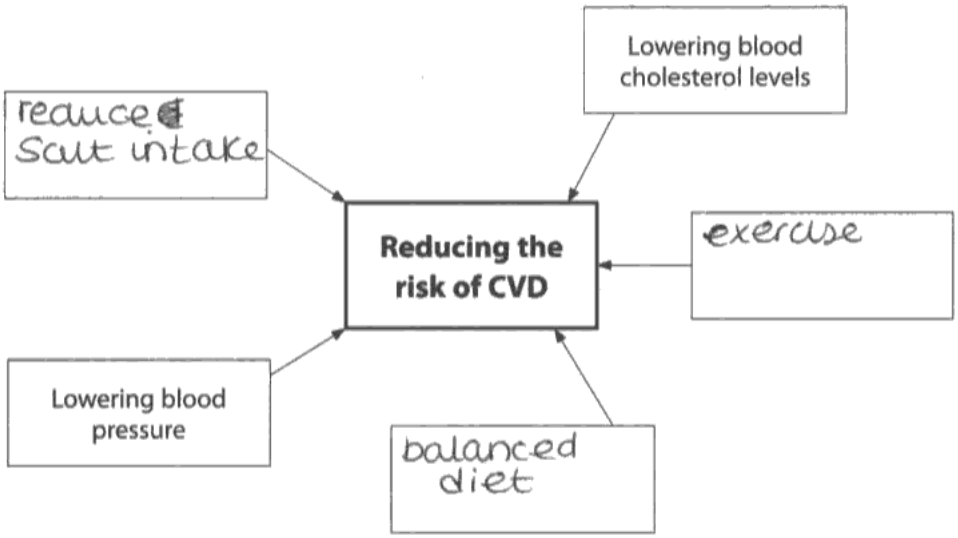
Candidates are becoming very familiar with questions relating to CVD and are now answering them well. This was a high scoring question in general; the marks lost tended to be through poor exam technique and not weak knowledge.

Marks were lost by candidates who did not read the question carefully and wrote down how to 'reduce' the risk of CVD and by those who gave answers that either scored the same marking point or were too vague.

5 The risk of developing cardiovascular disease (CVD) can be reduced in several ways. Lowering blood cholesterol levels and lowering blood pressure are two ways of reducing CVD.

(a) (i) Complete the diagram below by giving three other ways in which the risk of CVD may be reduced. Write your answers in the empty boxes.

(3)



ResultsPlus
Examiner Comments

In this response, the reference to balanced diet is too vague and the reference to exercise, without stating it should be increased or regular does not actually answer the question.

ResultsPlus
Examiner Tip

Do not simply list the risk factors associated with CVD; use your knowledge to actually answer the question.

Question 5 (a) (ii)

Candidates clearly know how high blood cholesterol causes CVD, but again marks were lost by candidates simply writing down what they know without actually answering the question.

The question asks the candidates to explain how lowering the blood cholesterol can reduce the risk of CVD, not how cholesterol causes CVD.

(ii) Explain how lowering blood cholesterol levels can reduce the risk of CVD. (2)

because lots of cholestrol can create plaque on arteries therefore making them thinner increasing the bloodpressure.

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Examiner Comments

In this response the candidate has not told us that reduced cholesterol would reduce the likelihood of a plaque forming, so cannot be awarded the second marking point. However, they know the consequence of plaque formation and can be awarded the third marking point.

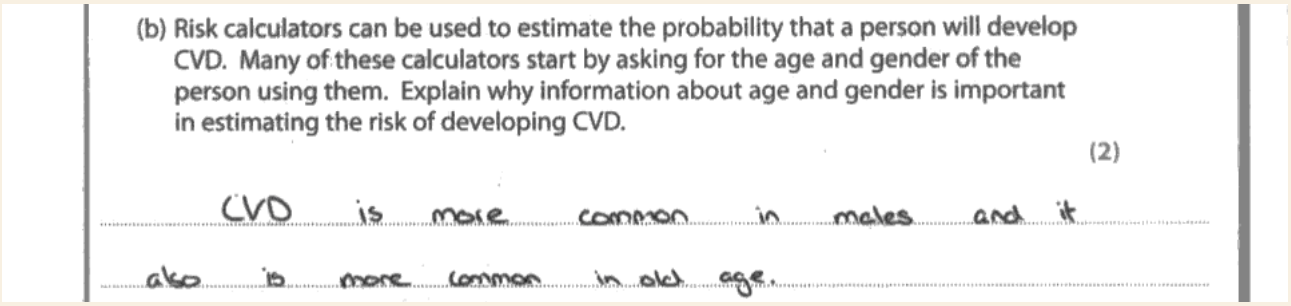
ResultsPlus
Examiner Tip

Do not skim-read the question, only identifying key words. Read the question through carefully at least once and then write down your knowledge in a way that answers the question.

Question 5b

This was a fairly straightforward question but one in which candidates lost marks through poor expression. Although in this question two marks could be scored if candidates simply wrote that males are at higher risk than females and risk increases as age increases, there were a number of very detailed responses actually explaining why this is the case.

With respect to age and CVD, we wanted to know that there is a positive correlation between inrceasing age and the risk of CVD.



(b) Risk calculators can be used to estimate the probability that a person will develop CVD. Many of these calculators start by asking for the age and gender of the person using them. Explain why information about age and gender is important in estimating the risk of developing CVD.

(2)

CVD is more common in males and it also is more common in old age.

ResultsPlus
Examiner Comments

This is an example of a typical response that we saw frequently, scoring only one mark. 'More common in old age' is not the same as an increasing risk with increasing age.

ResultsPlus
Examiner Tip

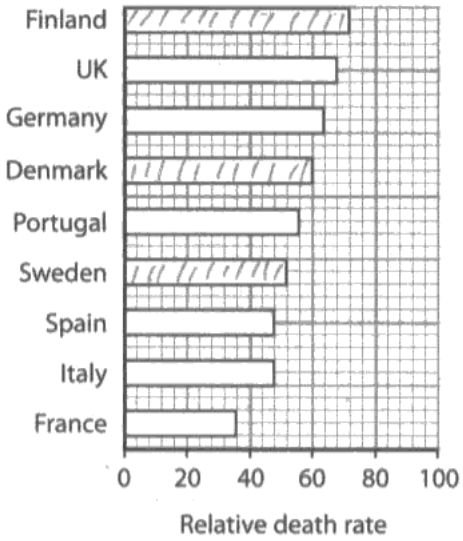
Always read through your answers very carefully to ensure that you have expressed yourself clearly and have actually said what you intended. Use any time you have left at the end to keep reading through your answers.

Question 5 (c) (I)

A relatively easy compare question with the majority of candidates scoring two marks. A calculation had to be performed to gain the third mark in this instance. Any attempt by candidates to put units onto their calculated answer was ignored.

Some candidates write very long sentences which if not carefully structured, can be ambiguous. It is usually better to write several simple sentences.

(c) The graph below shows the relative death rate from CVD in some countries in Western Europe.



(i) Compare the relative death rates from CVD in Finland, Denmark and Sweden.

(3)

The death rate for sweeden, Denmark and finland has a difference of 20 between them, finland has the highest death rate but there isn't a significant difference. Sweden has the lowest death rate.

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Examiner Comments

In this response the candidate has not made it clear which two countires have a death rate difference of 20. The response was awarded two marks for identifying Finland as the highest and Sweden as the lowest.

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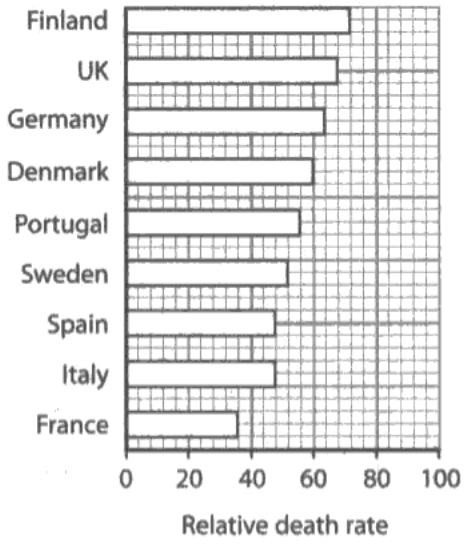
Examiner Tip

Write very short sentences. Only include one piece of information in each sentence, use correct Scientific terms and keep the rest of the language very simple.

Although we comment on this every session and keep repeating the advice to our own students, there is still a large number of candidates who do not do a calculation in data analysis questions.

(c) The graph below shows the relative death rate from CVD in some countries in Western Europe.



(i) Compare the relative death rates from CVD in Finland, Denmark and Sweden.

(3)

Finland has the highest death rate of CVD of around 70. Sweden has only 50, and Denmark 60. Finland has a much higher death rate than Sweden.

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Examiner Comments

Weaker candidates tend to read values off the graph and do not actually manipulate them. This is a typical example.

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Examiner Tip

Whenever answering a describe data or compare data question, always do a calculation. This does not have to be a complicated rate calculation or a percentage change calculation. A simple subtraction is often enough, provided it is exact and has units included.

Question 5 (c) (iii)

Candidates did not appear to be phased by data being presented in a map format and made good attempts at giving reasons for the differences between the data. The majority picked up on the possibility that the data had been collected at different times and many recognised that there is a difference between death rate and numbers of deaths. The possible misreading of the shading was taken into account by the examining team.

Candidates clearly recognise that there is a difference between numbers of deaths and death rate.

(iii) Suggest **one** reason for the differences between the data presented in the map and the data shown in the graph.

(1)

The data presented in the table shows the relative death rates for western europe whereas the data presented on the map shows the actual number of deaths in western europe.

ResultsPlus
Examiner Comments

In this response the candidate has identified the difference between the data but not gone far enough in their answer to actually describe what that difference is. i.e. no mention of population sizes.

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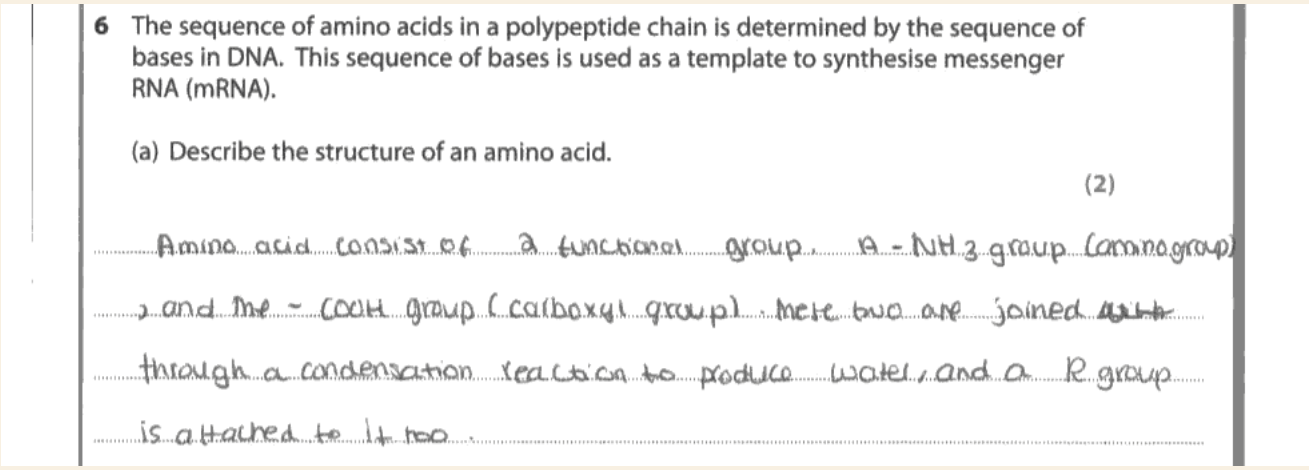
Examiner Tip

When answering a question try to write down some information that we have not actually told you.

Question 6 (a)

Candidates predominantly scored either zero or two marks for this question, depending on the description being of a mononucleotide or of an amino acid .



6 The sequence of amino acids in a polypeptide chain is determined by the sequence of bases in DNA. This sequence of bases is used as a template to synthesise messenger RNA (mRNA).

(a) Describe the structure of an amino acid.

(2)

Amino acid consist of a functional group, a -NH2 group (amino group) and the -COOH group (carboxyl group). here two are joined through a condensation reaction to produce water, and a R group is attached to it too.

ResultsPlus
Examiner Comments

This response was awarded 2 marks for the reference to the carboxyl group and to the R group. If candidates are going to use chemical formulae, they must be correct.

ResultsPlus
Examiner Tip

Unless specifically asked, it is safer to write out the name of a chemical as opposed to writing out its formula. If the formula is used then it must be correct, including any negative or positive charge it may have.

Question 6 (b)

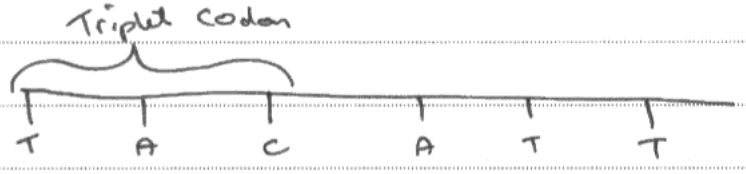
Many good responses, scoring max four marks were seen; candidates are clearly being prepared for the exam using previous mark schemes. There were still some common errors seen from the weaker students.

(b) Describe how mRNA is synthesised.

(4)

mRNA is synthesised in the nucleus when the double helix of the DNA is unwound. The mRNA is formed by free ~~amino acids~~ Bases joining to each other. ~~triplet codon of the~~ making a complimentary Strand, ~~that is~~

eg.



ResultsPlus
Examiner Comments

One common error is seen in this response. Instead of refering to mononucleotides, the candidate has stated that the bases join to each other.

ResultsPlus
Examiner Tip

For questions that frequently come up, such as transcription and translation, use previous mark schemes to learn the correct terminology.

There are candidates that lose marks by not being sufficiently precise in their answer.

(b) Describe how mRNA is synthesised.

(4)

mRNA is made in the nucleus of the cell in transcription. The DNA strand unwinds and free nucleotides line up with their complementary bases. The nucleotides are then bonded adjacently forming a strand of mRNA. In mRNA, thymine is replaced by uracil. The mRNA then leaves the ~~es~~ nucleus and goes into the cytoplasm, and the DNA returns to normal

ResultsPlus
Examiner Comments

In this response the candidate clearly understands the process and has scored three marks. However they have not been precise enough in stating where the nucleotides line up and what their bases are complementary to.

ResultsPlus
Examiner Tip

Make sure in your answers involving DNA and mRNA synthesis that it is very clear that mononucleotides line up against the existing DNA strand and that the bases on the nucleotides bind to their complementary bases on the DNA. You must use the term 'complementary' in your response and not just give an example.

Question 7a

Three common mistakes prevented some candidates from scoring highly in this relatively straightforward data question.

Firstly, refering to all the nutrients as either nutrients or vitamins, not distinguishing between the three vitamins and two minerals.

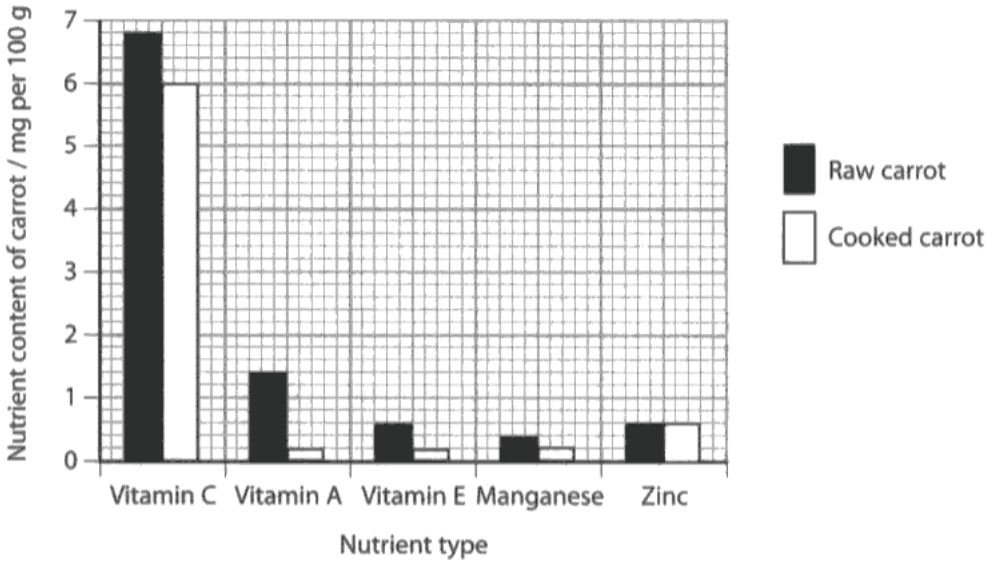
Secondly, describing the nutrient content in the raw carrot and not actually answering the question about the effect of cooking.

Thirdly, not adding units or correct units to a calculation.

This response illustrates two of these common errors.

7 When vegetables are cooked in boiling water, they may lose some of their nutrients.

The graph below shows the effect of cooking on the content of three vitamins and two minerals found in carrots.



(a) Using the information in the graph, compare the effects of cooking on the content of vitamins and minerals found in carrots.

(3)

The effects of cooking on the vegetable has ~~too~~ led the carrot to losing a substantional amount of nutrients ~~vitamins~~, All nutrients apart from zinc was altered. ~~This~~ vitamin E was hit hardest losing 1.2 nutrients per 100g.

ResultsPlus
Examiner Comments

This response only scored one mark, mark point two.

ResultsPlus
Examiner Tip

In data analysis questions, always use the stem of the question as a framework to write your answer; this will help you to answer the question and to be specific.
When you have done your calculation, copy the appropriate units from the graph very carefully.

Question 7 (b)

It was refreshing to see a question based on the compulsory practical work answered so well. Many candidates easily scored five marks max. Candidates are clearly learning about the practical procedures and the theory behind them and using previous mark schemes as a guide to what we expect them to know.

This is a good example of a high-scoring response. Seven of the possible mark points could be awarded to this response.

*(b) It has been suggested that cooking food in a microwave oven does not reduce the nutrient content of foods by as much as cooking in boiling water.

A student wanted to test this idea on the vitamin C content of carrots.

Describe an investigation that the student could carry out to compare these two methods of cooking on the vitamin C content of carrots.

(5)

5 cm^3 cubes of carrot should be cooked using each method. So 1 5cm^3 cube of carrot is boiled in H_2O and 1 5cm^3 cube of carrot would be microwaved. The boiled carrot sample should then be liquidised. The liquidised sample should have 2 cm^3 pored into a beaker DCPIP should be added drop by drop or titrated into the carrot juice until the colour changes from blue / purple to colourless. This should be repeated using the microwaved sample. Also with a control with a known concentration of vitamin C. These results should all be repeated 3 times for reliability. From this a concentration of vitamin C can be calculated and mean results worked out. results can be plotted on a graph and compared to draw a conclusion

ResultsPlus
Examiner Comments

Candidates who titrate the Vitamin C source into the DCPIP know that they are looking for a blue to colourless colour change. Those who add the DCPIP to the Vitamin C are not so aware that they are looking for the colour to remain blue, as is the case in this response.

ResultsPlus
Examiner Tip

Generally speaking if you are writing about an investigation include:
1) four or five of the important steps, stating names of any significant chemicals,
2) describe at least one variable that you are going to keep the same
3) state what you are going to measure or look for and how this will be used
4) state that the whole procedure will be repeated

Questions relating to practical procedures are ideal for assessing QWC as they carry a relatively high number of marks and require the steps to be given in order. Look out for the asterisk at the start of the question.

*(b) It has been suggested that cooking food in a microwave oven does not reduce the nutrient content of foods by as much as cooking in boiling water.

A student wanted to test this idea on the vitamin C content of carrots.

Describe an investigation that the student could carry out to compare these two methods of cooking on the vitamin C content of carrots.

(5)

DCPIP is used to decolorise vitamin C. It turns from ~~blue~~ blue to ~~colorless~~ colourless.

Place a known concentration of vitamin C in DCPIP and ~~test~~ check how ~~to~~ much is used to decolorise the solution.

~~Place~~ Then place the ~~ten~~ ~~carrots~~ carrots in DCPIP and check how much is used to ~~measure~~ decolorise the DCPIP. Do the same for the other carrots. ~~Compare the results~~ Repeat the experiment ~~test~~ three times and find the average. This makes the test reliable. Then do the same for the ~~others~~ carrots. Then repeat this experiment again and find the average. Put this in a graph.

ResultsPlus
Examiner Comments

This response started well but then got rather convoluted; it was necessary to do a lot of work to establish what was being described and therefore this response did not meet the QWC criteria. Two marks were awarded.

ResultsPlus
Examiner Tip

Try and express yourself logically in answers of this type. You can write down each step as a numbered point if that helps make the sequence easier to describe.

Question 8 (a) (i)

Compare questions can cause candidates problems for a number of reasons. Some write out two descriptions without stating any actual comparisons. Some candidates find it difficult to identify the main trends that need comparing. Others lose marks through poor exam technique by not making enough statements, not refering to the values on the x axis and not reading off values from the graph with sufficient accuracy.

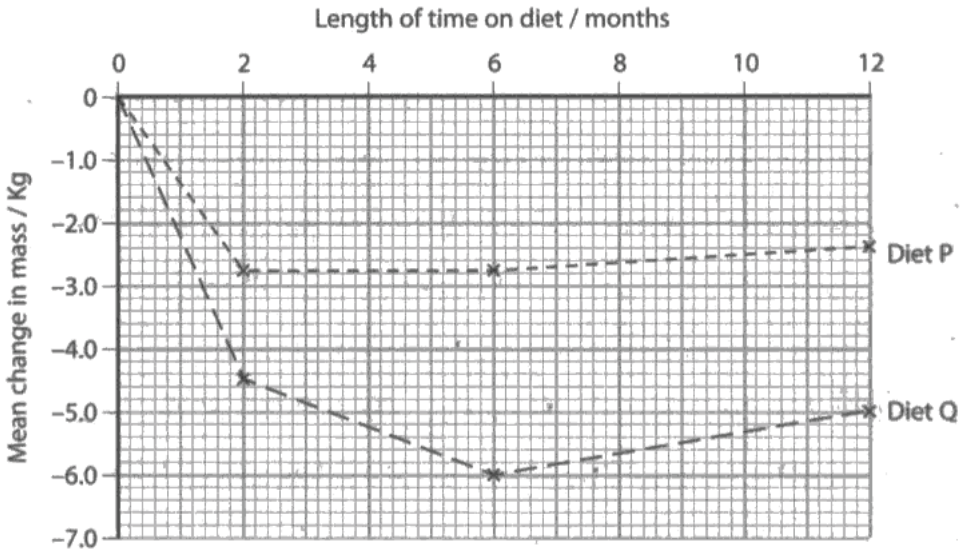
All of these were seen in the responses to this question. On the whole, the majority of candidates attempted the question and scored some of the marks.

8 Many different diets are available for people who want to lose weight. There is a lot of confusion over the merits of each one.

A scientist carried out an investigation to compare the effects of diet P and diet Q, on volunteers.

The changes in mass of two groups of volunteers on each of these diets were monitored over a 12-month period.

The graph below shows the mean changes in mass for each group of volunteers.



(a) (i) Compare the mean change in mass, over the first 6 months, for these two groups of volunteers.

(3)

at first both groups mass drops vastly however Diet Q's group drops furthest then Diet P's volunteers mass stops dropping and remains constant where as Diet Q's mass continues to drop but at a reduced rate. then both groups put ~~weight~~ mass back on

however group P only slightly but group Q gain more mass but are still lower than group P.

ResultsPlus
Examiner Comments

This response would have scored well if the candidate had stated the periods of time in which the described changes were taking place.

ResultsPlus
Examiner Tip

When answering questions of this nature, start each sentence with 'Between' and then quote two values from the x axis. So, in this question: Between 0 and 2 months those on diet P ..... Between 2 and 6 months those on diet P .....

8 Many different diets are available for people who want to lose weight. There is a lot of confusion over the merits of each one.

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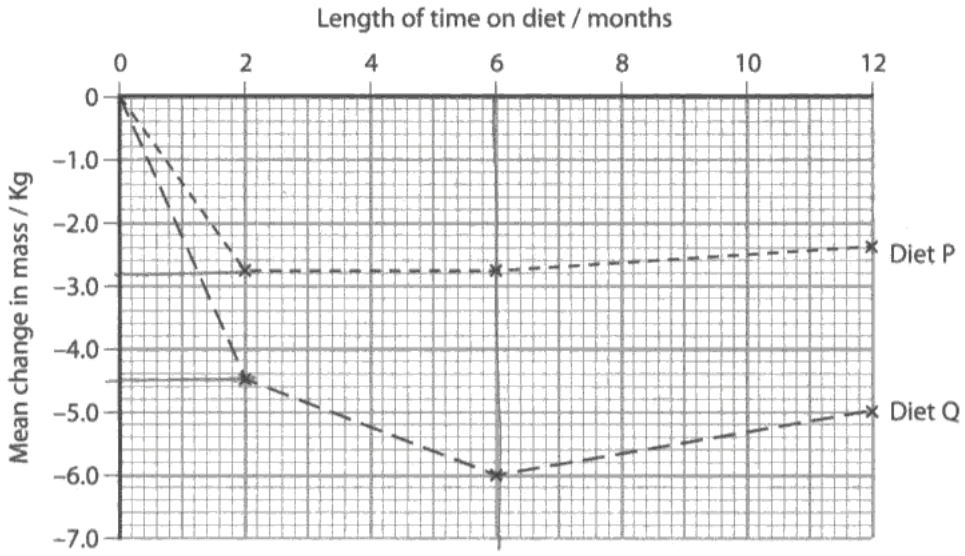

(a) (i) Compare the mean change in mass, over the first 6 months, for these two groups of volunteers.

(3)

Both diet Q & P had ~~reduced~~ high mean change in mass by the end of 6 months. They had both reached the highest change in mass ~~mean rate~~ they could go. At 2 months diet Q had a mean change in mass of -1.5kg and diet P had a mean change in mass of -3.8 kg. which was lower than diet Q by -0.7 kg.

ResultsPlus
Examiner Tip

When describing changes always state whether something is increasing or decreasing and if there is no change then state that it is staying the same.

ResultsPlus
Examiner Comments

In this response the candidate made time referencesbut were not specific enough about the type of changes that were occuring. The examiner will not assume that a change is a decrease just before a negative sign is put in front of the number.

Question 8 (a) (iii)

All candidates could give two variables but some answers could not be credited as they were irrelevant to the context of the question or were too vague.

(iii) State **two** variables that the scientist needed to control in this investigation.

(2)

1 The number of volunteers in each diet

2 The amount of exersise in each group

ResultsPlus
Examiner Comments

Irrelevant references to the number of individuals in the study were seen a number of times. Some candidates fail to appreciate that taking the mean value of data allows for any differences in sample sizes.

(iii) State **two** variables that the scientist needed to control in this investigation.

1 The amount of added calories consumed ~~the exercise the people do~~ (not everyone will follow the diets).

2 ~~The length of time~~ The lifestyle of the volunteers.

ResultsPlus
Examiner Comments

In this response, the number of calories is controlled by the diet plan and is therefore not an appropriate suggestion. The reference to lifestyle is too vague.

ResultsPlus
Examiner Tip

Always read the question through very carefully to ensure that your answer is going to be relevant to the context of the question.

Summary

In order to improve their performance in future papers, candidates need to:

1) Read the question through very carefully.

2) Be as specific and / or detailed as possible in their answer.

3) Use the abbreviations used in the specification.

4) Include a calculation in questions where they are asked to describe or compare data.

5) Include the units in their calculated answers when appropriate.

6) Use mark schemes from previous papers in their revision schedules.

7) Pay particular attention to spelling and organisation of their answer in QWC assigned questions.

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