

Examiners' Report  
June 2012

GCSE Biology 5BI2H 01

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June 2012

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## **Introduction**

This is the first B2 paper testing the new specification. Probably the most significant development in this paper is the introduction of the two 6 mark questions that assess the quality of written communication. Some of the content in this new specification is very prescriptive and candidates coped with this well.

Examiners were impressed at the high quality of answers seen. It was clear that candidates have been well-prepared for this exam; answers matched the requirements of the specification and at an appropriate level, and candidates knew the expectations of the various command words. It was also good to see a progression in the expression of candidate responses between the 5BI1 papers and this one. Answers were better structured and there was more frequent use of Biological terms.

The majority of candidates responded well to the two 6 mark questions and demonstrated some extensive knowledge of both of the topics chosen for this paper.

### **Question 1 (a) (i)**

This question caused few problems to candidates with the majority answering it correctly.

### **Question 1 (a) (ii)**

This question was not quite so well answered, with answers such as diffusion, osmosis and transpiration appearing.

### **Question 1 (a) (iii)**

About half the candidates answered this question correctly. Common incorrect answers included vague references to vessels, and as expected, phloem.

### **Question 1 (b) (i) - (ii)**

A whole range of responses was seen for this question. Common errors included lines not drawn with a ruler, lines being drawn through the first and last points, more than one line drawn and mis-reading of the x axis scale. The mark scheme was designed in such a way that candidates who had drawn one line in the wrong place, could still get a mark for part (ii).

(b) A student investigated osmosis in a courgette.

The photograph shows a courgette.

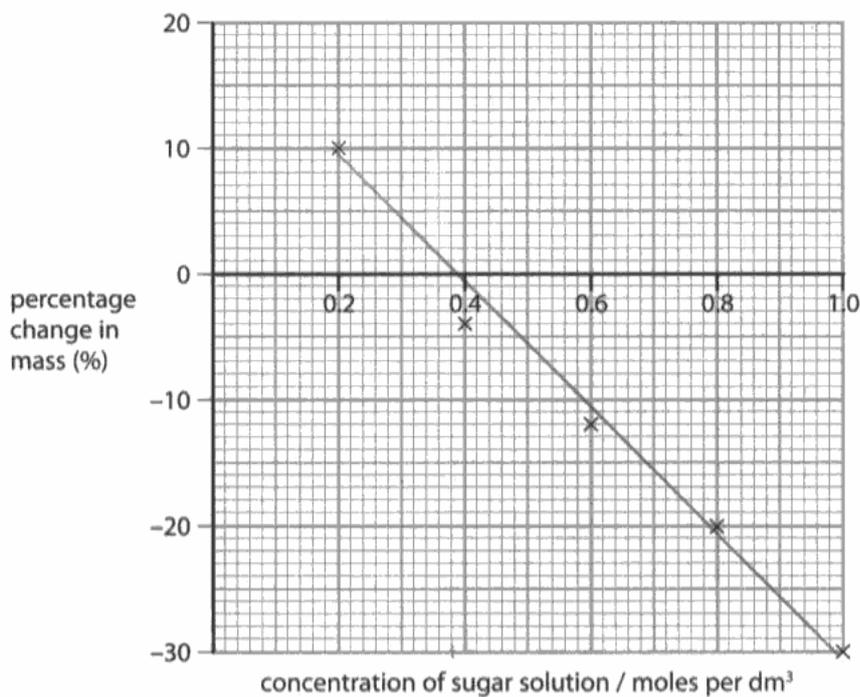


The student weighed pieces of courgette and placed them in five different concentrations of sugar solution.

After one hour she dried and reweighed the pieces of courgette.

She calculated the percentage change in mass.

The graph shows the results of this investigation.



(i) Draw a line of best fit on the graph.

(1)

(ii) Use your line of best fit to estimate the concentration of sugar solution that would result in no change in mass.

(1)

estimate = 0.38 moles per dm<sup>3</sup>

**ResultsPlus**  
Examiner Comments

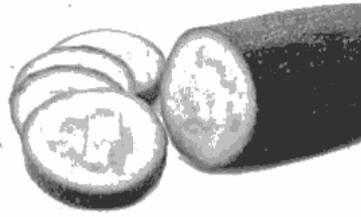
This response scored both marks. The line was reasonable, with points both above and below the line, and the value given of 0.38 was within the half square tolerance.

**ResultsPlus**  
Examiner Tip

Take care when drawing graphs and reading values. The question might seem easy but you must be very accurate in order to get both marks.

(b) A student investigated osmosis in a courgette.

The photograph shows a courgette.

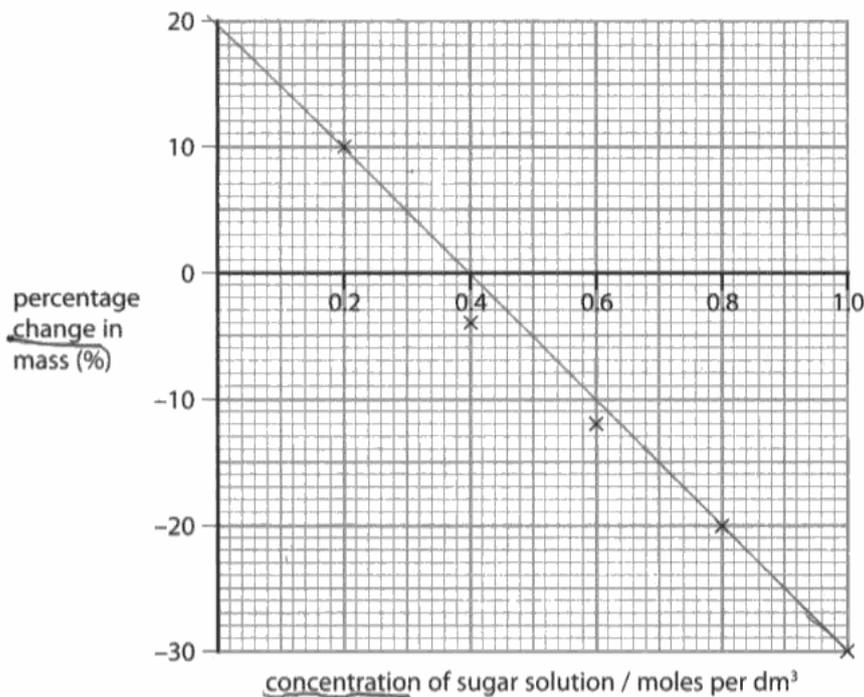


The student weighed pieces of courgette and placed them in five different concentrations of sugar solution.

After one hour she dried and reweighed the pieces of courgette.

She calculated the percentage change in mass.

The graph shows the results of this investigation.



(i) Draw a line of best fit on the graph.

(1)

(ii) Use your line of best fit to estimate the concentration of sugar solution that would result in no change in mass.

(1)

estimate = 0.4 moles per dm<sup>3</sup>



### ResultsPlus Examiner Comments

Although there was no data point on the y axis, we did not penalise candidates who extended their line up to this axis. However, this line of best fit was not considered good enough to score the mark as there are only crosses below the line and none above it.

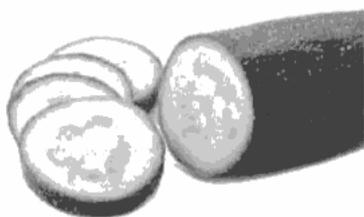


### ResultsPlus Examiner Tip

A line of best fit needs to go through the middle of the points plotted - try and balance the number of points above the line with the number below.

(b) A student investigated osmosis in a courgette.

The photograph shows a courgette.

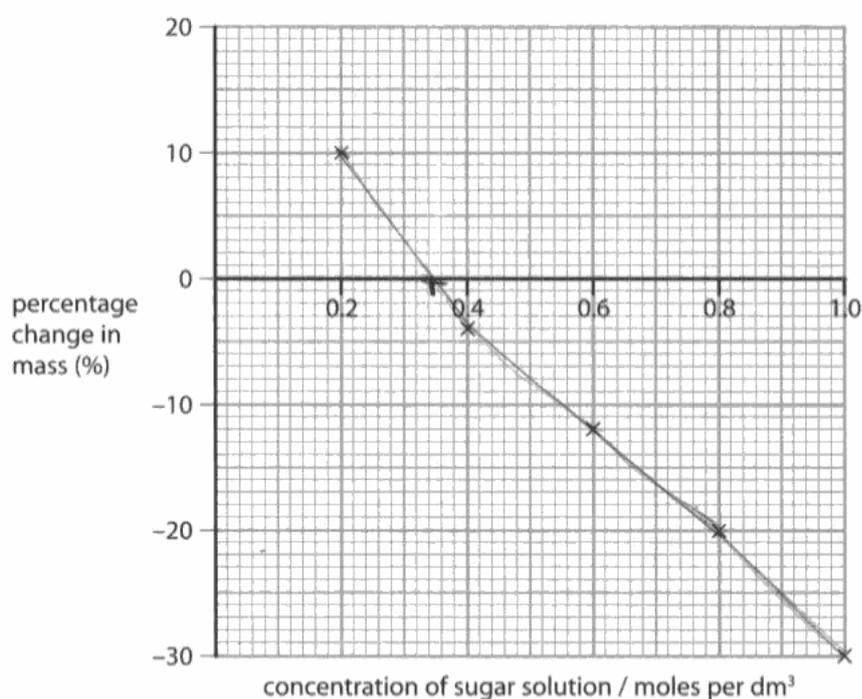


The student weighed pieces of courgette and placed them in five different concentrations of sugar solution.

After one hour she dried and reweighed the pieces of courgette.

She calculated the percentage change in mass.

The graph shows the results of this investigation.



(i) Draw a line of best fit on the graph.

(1)

(ii) Use your line of best fit to estimate the concentration of sugar solution that would result in no change in mass.

(1)

estimate = 3.4 moles per dm<sup>3</sup>

### ResultsPlus Examiner Comments

A line of best fit requires the candidate to draw a straight line through the middle of all the points.

This candidate could still have scored the second mark, had they read the value accurately from the graph.

### ResultsPlus Examiner Tip

Values need to be read carefully from graphs. Always double check the scale used for the x and y axis.

### Question 1 (b) (iii)

Although many candidates appeared to understand what this question was essentially about, the answers were poorly expressed biologically, so that few gained full marks.

Many candidates tried to describe the concentration differences. Descriptions that were presented in terms of the water or the sugar concentration were equally acceptable.

(iii) Explain why there was an increase in the mass of the courgette in the sugar solution at 0.2 moles per  $\text{dm}^3$ . (3)

~~there was an increase in the mass of the courgette in the sugar solution at 0.2~~ Because, ~~of~~ the low concentration of sugar, more of the liquid in the solution can be absorbed by the courgette.



#### ResultsPlus Examiner Comments

This example is fairly typical of responses where the candidate does not make it clear whether they are describing the concentration inside or the outside of the courgette.



#### ResultsPlus Examiner Tip

Try to be as specific as possible in your answers. In questions of this nature, it is important to be clear where molecules are at their most concentrated.

This example also illustrates the problems candidates had expressing themselves clearly enough.

(iii) Explain why there was an increase in the mass of the courgette in the sugar solution at 0.2 moles per  $\text{dm}^3$ . (3)

The courgette had a lower concentration than the sugar solution which meant the solution diffused into the courgette resulting in an increase of mass in the courgette.



#### ResultsPlus Examiner Comments

The candidate does not tell us what molecule had a lower concentration inside the courgette.

This response was also fairly typical in that they have referred to 'the solution' diffusing in. Had they said that the solution had moved in by osmosis then the response would have been credited.



#### ResultsPlus Examiner Tip

When referring to concentrations of molecules, make it very clear which molecule you are talking about.

If you are writing about the movement of water, then always use the term 'osmosis' but do not forget: **only** water moves by osmosis.

## Question 2 (a) (i)

This was answered correctly by a significant majority of candidates, with meiosis being the most common incorrect answer given. There were a lot of spelling variations seen, but provided there was a 't' in the answer provided, the mark was awarded.

## Question 2 (a) (ii)

Generally, this question was well answered. Comments on the strawberry runners being identical to the parent plant, and their cheapness, were frequently seen.

(ii) Farmers cut the runners and sell the new plants.

Suggest advantages of producing new strawberry plants in this way.

(2)

- if the parent plant produces good strawberries, so will the new plant, as they're ~~have~~ <sup>genetically</sup> identical.  
- it will be cheaper because the farmer will only have to ~~buy~~ <sup>buy</sup> 1 strawberry plant to get multiple strawberry plants.



**ResultsPlus**  
Examiner Comments

This is a very typical response to this question.



**ResultsPlus**  
Examiner Tip

Always check to see how many marks a question has been allocated. If you have been asked to suggest advantages and there are two marks allocated to the question, you must suggest **two** advantages at least.

Suggest advantages of producing new strawberry plants in this way.

(2)

They are the same quality as the parent plant and the process doesn't take as long as growing the plant from scratch.



**ResultsPlus**  
Examiner Comments

Another good answer. The candidates could phrase their answer in a number of ways to gain their marks for this question.

## Question 2 (b)

This question illustrates how practical work, that is part of the specification content, needs to be covered in quite specific detail, with the candidates understanding key procedures.

Suggest the purpose of stages 1 and 3 in the DNA extraction.

(2)

stage 1 <sup>break</sup> Stage 1 is to get rid of the cell membrane and wall so that you can extract the DNA inside.

stage 3 Stage 3 is so that you can see the DNA as a white strips/form so that you know were to aim to get extract it.



**ResultsPlus**

**Examiner Comments**

This response was awarded both marks. A number of candidates simply wrote that stage 1 and stage 2 were so that the DNA could be extracted - repeating the question. This candidate has given more information.



**ResultsPlus**

**Examiner Tip**

Be careful not to simply repeat the question in your answers - marks will not be awarded for information that has already been given to you.

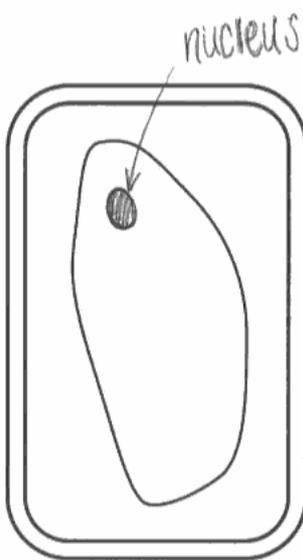
## Question 2 (c) (ii)

This question illustrates that some specification points can be tested through the drawing of diagrams.

A range of responses were seen for this question. The mark scheme was designed so that candidates would not lose two marks for drawing their nucleus in the wrong position.

(ii) This DNA is found in a structure within a cell of a strawberry plant.

On the diagram of a plant cell, draw and name the structure containing DNA. (2)



### ResultsPlus Examiner Comments

This candidate cannot be awarded mark point 1 as the location of the nucleus is wrong. The candidate does get a mark for labeling the nucleus.



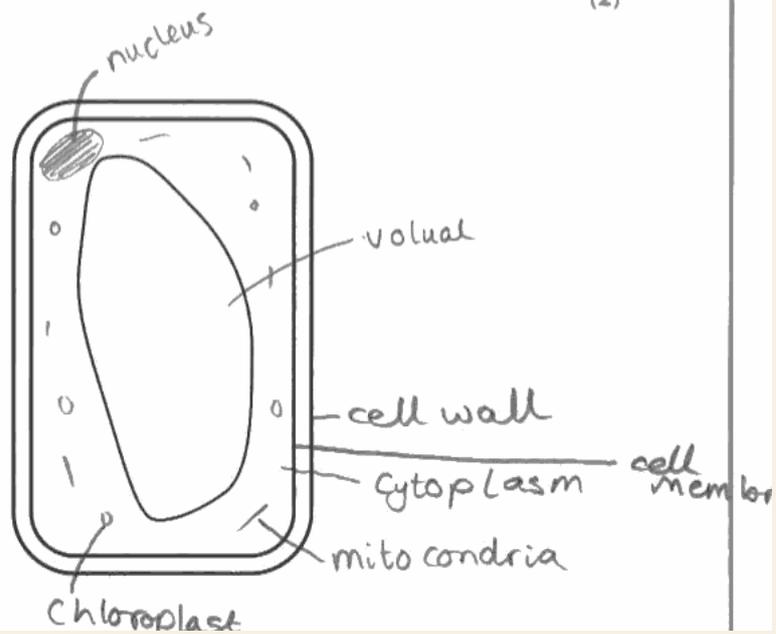
### ResultsPlus Examiner Tip

Always attempt a question, even if you are unsure of the answer. You will get no marks for leaving a question blank, but you might pick up a mark by attempting it.

(ii) This DNA is found in a structure within a cell of a strawberry plant.

On the diagram of a plant cell, draw and name the structure containing DNA.

(2)



### ResultsPlus

**Examiner Comments**

Some candidates tried to cover all options and drew and labelled all sorts of structures, as this candidate has done. However, although we can award the first mark point for the correct location of the nucleus, we cannot decide which structure the candidate is indicating contains the DNA.



### ResultsPlus

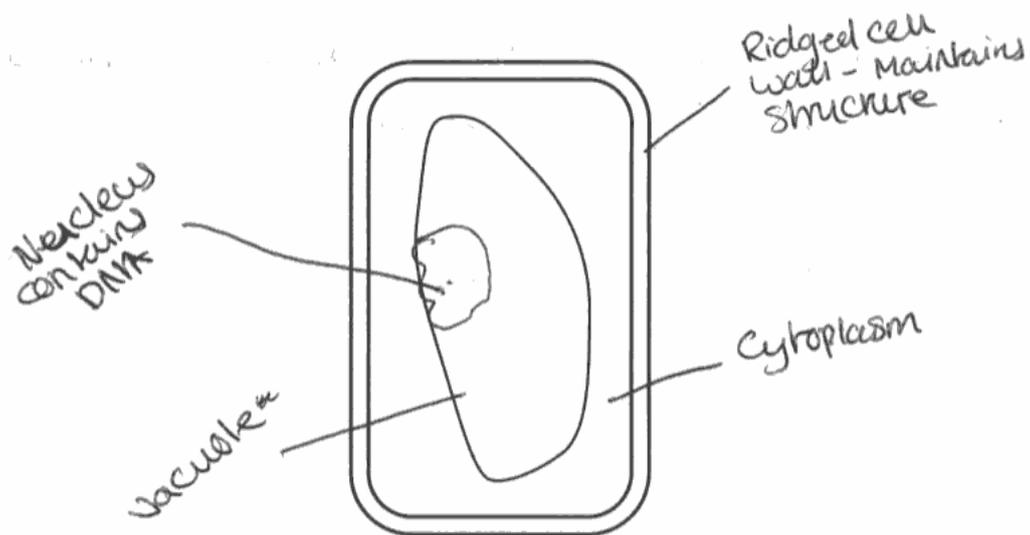
**Examiner Tip**

Try to do exactly what the question asks you to do - you could be compromising your answer by trying to do too much.

(ii) This DNA is found in a structure within a cell of a strawberry plant.

On the diagram of a plant cell, draw and name the structure containing DNA.

(2)



**ResultsPlus**  
Examiner Comments

Although this candidate has labelled several structures, they have indicated which structure contains the DNA; this candidate can be awarded the second mark.

### Question 3a

Approximately two thirds of candidates were able to explain that an organ consists of more than one tissue. The most frequently seen wrong answers were descriptions that included cells, or a reference to the tissues being of the same type.

### Question 3c

A range of responses was seen for this item, with many candidates demonstrating a good understanding of the adaptations of the villus for absorption. The features commented on most frequently were the large surface area and the good blood supply. Very few candidates commented on the presence of the microvilli.

(c) Explain how the structure of villi allows efficient absorption of the soluble products of protein digestion.

(4)

The villi small intestine contains a villi, the villi has:

- A large surface area, which allows quick absorption of digested food in the blood.
- It has a single layer of surface cells which allow quick diffusion of digested food over a short distance.
- It also has a good blood supply via the capillary ~~network~~ network this assists quick ~~aber~~ absorption of digested food. (~~such as protein digestion~~). (such as the digested molecules of protein).



**ResultsPlus**  
Examiner Comments

This response illustrates the high quality of some of the responses that we saw for this question.

(c) Explain how the structure of villi allows efficient absorption of the soluble products of protein digestion.

- (4)
- The villi are in folds so have a large surface area. This means more absorption happens.
  - The villi are also only one cell thick so the diffusion/ ~~pathway~~ absorption pathway is a lot smaller.
  - The villi has a network of lots of capillaries so that there is more blood passing next to the products of amino acids in the small intestine this means more absorption/diffusion happens.



**ResultsPlus**  
Examiner Comments

This response was awarded 4 marks. We allowed the third mark point to be awarded as the candidate clearly has the right idea about the diffusion distance being small, even though their description of the one cell thick villus is not accurately worded.

### Question 3 (d) (i)

This calculation was attempted by the majority of candidates, with many scoring the full two marks. The mark scheme was designed to avoid candidates losing both marks if they mis-read the value from the graph. The most common error was reading the value from the graph as 83%.

(i) The total number of live bacteria in the chocolate was five million.

Calculate the number of live bacteria from the chocolate that survived in the stomach. (2)

86% of 5 million

$$\frac{5,000,000}{100} = 50,000$$
$$50,000 \times 86 = 4,300,000$$

answer = 4,300,000 live bacteria.



**ResultsPlus**  
Examiner Comments

This candidate showed their working clearly and calculated the correct answer.

(i) The total number of live bacteria in the chocolate was five million.

Calculate the number of live bacteria from the chocolate that survived in the stomach. (2)

Milk = 5  
Chocolate = 86

91 = 5 million  
~~91~~  
= 94.5% of 5 million

$$\frac{86}{91} \times 5,000,000 = 4,725,000$$

25,000

70.50.00  
10% = 500,000  
x4 = 4,500,000  
+ 200,000

answer = 4,725,000



**ResultsPlus**  
Examiner Comments

This candidate read the value from the graph correctly but did not calculate the correct answer. They scored 1 mark.



**ResultsPlus**  
Examiner Tip

Always attempt calculations and show all your working. You may pick up marks for your working, even if you do not end up with the correct answer at the end.

(i) The total number of live bacteria in the chocolate was five million.

Calculate the number of live bacteria from the chocolate that survived in the stomach.

(2)

85% of 5 000 000

answer = 4250000



### ResultsPlus Examiner Comments

This candidate mis-read the graph, but still scored 1 mark for the answer calculated using their value. If the candidate had not shown their working and just written their wrong answer then they would have scored zero.



### ResultsPlus Examiner Tip

Always show all your working.

### Question 3 (d) (ii)

Candidates coped well with the slightly unusual context of this question and some very good suggestions were made as to the survival differences of the probiotic bacteria in milk compared to chocolate.

(ii) Suggest a reason for the survival differences of probiotic bacteria in chocolate compared with probiotic bacteria in milk.

(1)

Because the chocolate is solid and so takes longer for the bacteria to be digested and killed.

(Total for Question 3 = 10 marks)



**ResultsPlus**

**Examiner Comments**

The idea of chocolate being solid and milk being liquid was probably the most common suggestion. This candidate went on to explain why this should make a difference but this was not actually necessary for the mark.



**ResultsPlus**

**Examiner Tip**

Whenever you see the command word 'suggest' do not panic and leave a blank answer. Quite often stating the obvious will gain you a mark. A blank answer will only guarantee you no marks.

(ii) Suggest a reason for the survival differences of probiotic bacteria in chocolate compared with probiotic bacteria in milk.

(1)

In milk there are less probiotic bacteria meaning that they are easier to be killed off.



**ResultsPlus**

**Examiner Comments**

This is another example of a reasonable suggestion.

(ii) Suggest a reason for the survival differences of probiotic bacteria in chocolate compared with probiotic bacteria in milk.

(1)

A reason for the survival differences might be because there is a higher concentration of probiotic bacteria in the chocolate.

(Total for Question 3 = 10 marks)



**ResultsPlus**  
Examiner Comments

This is the reverse argument.



**ResultsPlus**  
Examiner Tip

Sometimes an answer can be written in one of two ways.  
Always make it very clear what you are writing about.  
Try and avoid starting sentences with 'it' or 'they'.

## Question 4 (a)

A fairly straightforward calculation that the majority of candidates attempted.

When calculations carry two or more marks, candidates need to show their working so that they may still be able to pick up some marks for their working, even if they make a mistake in the final answer.

- 4 The volume of blood that the heart pumps with every beat is known as the stroke volume.

Stroke volume can be used to indicate fitness level.

The table gives information about the stroke volume, heart rate and cardiac output of an athlete at rest and during exercise.

athlete	stroke volume / dm <sup>3</sup>	heart rate / beats per minute	cardiac output / dm <sup>3</sup> min <sup>-1</sup>
at rest	0.1	53	5.3
during exercise	5.9	182	30.4

- (a) Calculate the stroke volume of the athlete during exercise.

(2)

$$\frac{182}{30.4} = 5.9$$

answer = ~~5.9~~ 5.9 ..... dm<sup>3</sup>



**ResultsPlus**

**Examiner Comments**

This candidate could have scored 1 mark had they rounded up their answer correctly. They did not get the first mark as their division sum is upside down, however they could have got the second mark for correctly evaluating their sum.



**ResultsPlus**

**Examiner Tip**

It is vital that you show your working for any calculation. When checking through your answers at the end, redo the calculation and check that you have copied down the correct numbers and rounded up values correctly.

- 4 The volume of blood that the heart pumps with every beat is known as the stroke volume.

Stroke volume can be used to indicate fitness level.

The table gives information about the stroke volume, heart rate and cardiac output of an athlete at rest and during exercise.

athlete	stroke volume / dm <sup>3</sup>	heart rate / beats per minute	cardiac output / dm <sup>3</sup> min <sup>-1</sup>
at rest	0.1	53	5.3
during exercise		182	30.4

- (a) Calculate the stroke volume of the athlete during exercise.

$$\text{cardiac output} = \frac{\text{heart rate} \times \text{stroke volume}}{\text{stroke volume}} \quad (2)$$

answer = 0.167 dm<sup>3</sup>



**ResultsPlus**  
Examiner Comments

A candidate scores full marks for just the correct answer.



**ResultsPlus**  
Examiner Tip

It is much safer to show your working, just in case you do make a mistake.

- 4 The volume of blood that the heart pumps with every beat is known as the stroke volume.

Stroke volume can be used to indicate fitness level.

The table gives information about the stroke volume, heart rate and cardiac output of an athlete at rest and during exercise.

athlete	stroke volume / dm <sup>3</sup>	heart rate / beats per minute	cardiac output / dm <sup>3</sup> min <sup>-1</sup>
at rest	0.1	53	5.3
during exercise	348 0.16	182	30.4

- (a) Calculate the stroke volume of the athlete during exercise.

348

(2)

answer = 0.16 dm<sup>3</sup>



**ResultsPlus**  
Examiner Comments

This candidate scored zero for this item as they only gave the answer which was incorrectly rounded. Their answer of 0.16 indicates that they did the right division but method marks cannot be awarded if they do not show their working.



**ResultsPlus**  
Examiner Tip

Always show your working.

## Question 4 (b)

It was very encouraging to see very few blank responses for this item. The most common error was to describe the role of blood in delivering oxygen to the muscles without writing a comparative answer to explain why the cardiac output needs to **increase** during exercise. Some candidates got side-tracked in their responses and talked about breathing rate increasing to get more oxygen into the blood.

Although all of the mark points, except the third one, are written as comparative statements, examiners only required the candidate to make one comparative statement to access these marks.

(b) Explain why it is important that the cardiac output of the athlete increases during exercise. (3)

*This is so more oxygenated blood can go  
muscles cells to provide them with oxygen and  
glucose, and which can be made into energy.  
and also so waste water and CO<sub>2</sub> can  
be expelled from the body through the blood  
quickly.*



**ResultsPlus**

**Examiner Comments**

The first sentence starts with a comparative statement so this response scores the full three marks.



**ResultsPlus**

**Examiner Tip**

Read through the question carefully before answering. When you have written your answer, read through it carefully and then read the question again to make sure your response actually answers the question.

(b) Explain why it is important that the cardiac output of the athlete increases during exercise.

(3)

- The cells and muscles use more energy so need more.
- To get energy they need to respire, so they need oxygen.
- So the heart pumps the blood around quicker so more oxygen reaches the cells.



**ResultsPlus**

**Examiner Comments**

A response written as bullet points is perfectly acceptable, provided there is enough context. Just a list of key words would not be sufficient.



**ResultsPlus**

**Examiner Tip**

Listing / bullet pointing your answer can help you to make your answers clearer. This can also help you to make sure that you write enough points to gain full marks.

(b) Explain why it is important that the cardiac output of the athlete increases during exercise.

(3)

- To supply the athlete's cells with blood contain oxygen.
- Oxygen is used for aerobic respiration which releases energy.
- Energy is needed to maintain the exercise.



**ResultsPlus**

**Examiner Comments**

Although this candidate has a good understanding of the requirement of oxygen for respiration to release energy for exercise, there is no comparative statement, so this response does not answer the question. 1 mark was awarded for the reference to respiration.

## Question 4 (c)

The responses to this question were probably the most disappointing. The question was directly from the specification. It was decided to credit a comment about substances being carried in the blood plasma (mark point 4) and examiners were impressed to see just how many candidates were being specific about these substances being present in the plasma.

(c) Describe how the circulatory system transports substances around the body.

(2)

Veins and arteries send substances back and forth around the body



**ResultsPlus**

**Examiner Comments**

This candidate has identified the blood vessels involved but not made it clear which blood vessel is carrying blood in which direction. There is no reference to the heart, which is also necessary when describing direction of blood flow in arteries and veins.



**ResultsPlus**

**Examiner Tip**

Never try and roll two pieces of information into one sentence. If you do, your response may become very ambiguous, and as a result you could end up with no marks. If you write one sentence about the veins, and then another about the arteries, the description about the direction of blood flow is likely to be clearer.

(c) Describe how the circulatory system transports substances around the body.

(2)

We take in  $O_2$  and  $CO_2$  through respiration. This is then transported from the lungs <sup>and heart</sup> to the rest of the body then oxygenated blood while the  $CO_2$  leaves the body thru the mouth. The de oxygenated blood then travels back to the heart.



**ResultsPlus**

**Examiner Comments**

Candidates should be encouraged to be more familiar with the wording on the specification. This will help them understand what is required.



**ResultsPlus**

**Examiner Tip**

If you are unsure of the correct chemical formulae, then do not use them.

(c) Describe how the circulatory system transports substances around the body.

(2)

Red blood cells, plasma and white blood cells are all transported around the body via the blood stream, the arteries and veins pump these cells to and from the heart, and around the body.



**ResultsPlus**

**Examiner Comments**

This is another example of an ambiguous response. Separate sentences about the veins and the arteries would have scored this candidate 2 marks instead of none.

#### **Question 4 (d)**

Some good responses were seen for a question set in an unfamiliar context.

## Question 5 (a) (i)

A well-answered question, with candidates displaying a good understanding of the problems associated with cloning.

5 In May 2011, the Food Standards Agency stated that meat and milk produced from cloned animals should be allowed to go on sale to the public.

(a) (i) Describe the risks associated with cloning mammals.

The cloned animals <sup>are at high risk of getting</sup> ~~will get~~ health problems and will live a short and maybe painful life. <sup>(3)</sup> ~~AD~~ scientists haven't yet found a way to ~~to~~ make cloned animals live longer and to stop them from getting diseased ect.



**ResultsPlus**

**Examiner Comments**

Although the candidate has written four lines, they have only given one specific risk associated with cloning - the short life span. The reference to health problems is too vague to be awarded a mark.



**ResultsPlus**

**Examiner Tip**

Try and write short snappy sentences, and then make sure that you have written at least as many sentences, each making a different point, as there are marks allocated to a question.

5 In May 2011, the Food Standards Agency stated that meat and milk produced from cloned animals should be allowed to go on sale to the public.

(a) (i) Describe the risks associated with cloning mammals.

~~At~~ Cloning mammals causes a reduction in the gene pool. Cloned mammals are often born with genetic disorders, they have weaker immune systems and do not live as long - proved by the first mammal cloned - Dolly the Sheep. <sup>(3)</sup>



**ResultsPlus**

**Examiner Comments**

This example illustrates the high quality of response that we saw typically for this question.

5 In May 2011, the Food Standards Agency stated that meat and milk produced from cloned animals should be allowed to go on sale to the public.

(a) (i) Describe the risks associated with cloning mammals.

(3)

cloning mammals are hard and sometimes don't always work. Also The animals could get diseases and infections easily because their immune systems aren't as good. Also The animals could age quicker and get problems such as arthritis at an early age.



**ResultsPlus**  
Examiner Comments

The reference to diseases and infections is too vague. We had two mark points relating to disease. one mark point related to genetic diseases and the other point was for the idea that cloned animals could be susceptible to the same disease.

### Question 5 (a) (ii)

Some excellent responses were seen about the cloning of mammals by a number of candidates. Many responses included several points about cloning, that had been included in the indicative marking section. It is important to remember that this is not a mark scheme; candidates do not get a mark for each point made.

\*(ii) A cloned animal contains genetic information that is identical to its parent.

Describe the stages in the production of a cloned mammal.

could  
provoke  
protest or ev  
(6) riots

~~A cell is~~ a cell nucleus from one mammal is extracted and placed into an enucleated cell. This cell is then given stimulated with small electrical charges to stimulate growth. The growing embryo is then placed into the uterus of a surrogate mammal where it will develop at the normal rate of an embryo. When the mammal is born it is genetically identical to the mammal the cell nucleus was taken from. This is asexual reproduction.



**ResultsPlus**  
Examiner Comments

This example illustrates one of the excellent responses that we saw. At least five stages have been described in order, achieving a level three response. Although 'surrogate' has been spelt incorrectly, this is insufficient to reduce the mark to five.

\*(ii) A cloned animal contains genetic information that is identical to its parent.

Describe the stages in the production of a cloned mammal.

(6)

The DNA <sup>nucleus,</sup> from the parent is removed using enzymes. Another nucleus is removed in another parent that is going to be the birth mother. The nucleus from the first parent is inserted, using enzymes, to the egg cell that doesn't have a nucleus because it was removed. It grows into an embryo and then ~~is~~ comes alive in the outside world. ~~The~~ The DNA can be extracted from a hair cell, but has to be inserted in the egg cell that doesn't contain any genes from that parent.



**ResultsPlus**  
Examiner Comments

This is an example of a level 2 response. The candidate does have the basic idea of the cloning process but cannot relate specific, accurate detail. There are however, three or more stages given; the marking criteria for a level 2 response.

\*(ii) A cloned animal contains genetic information that is identical to its parent.

Describe the stages in the production of a cloned mammal.

(6)

There must be an A animal and a B animal of the same species.  
They take an fertilisation egg from B animal and place it in  
A animal whilst removing the embryonic cell from A animal.  
They ~~also~~ shoot the fertilisation egg in from a microscopic  
gun. over time A animal goes through pregnancy until the C  
animal is born. C animal is the cloned animal e.g. Dolly the sheep.  
~~The process however~~



### ResultsPlus Examiner Comments

This is an example of a level 1 response, just. On reading this through the first time it appears that the candidate does not understand the process. However, they do know that cells need to be removed from the same species and that one animal gives birth to another animal's baby following the transfer of something.



### ResultsPlus Examiner Tip

Never leave a response blank. Always write what you can; you may score some unexpected marks.

\*(ii) A cloned animal contains genetic information that is identical to its parent.

Describe the stages in the production of a cloned mammal.

(6)

First of all to clone a mammal you would 3 parent mammals. You would take the <sup>fertilised</sup> egg cell from the first sheep and a sperm cell from a second sheep. Then you would ~~create~~ <sup>put</sup> these cells together and electricute them together to <sup>put</sup> make more eggs out of them two. you would then freeze these eggs for some time and when the 3rd parent mammal is ready you would place these eggs in her stomach where after sometime she will have a clone of the first parent from where the egg cell came.



**ResultsPlus**

**Examiner Comments**

This response illustrates a level 0 response. The candidate has clearly confused cloning with IVF. Although we can ignore the details relating to IVF, there is insufficient detail about cloning to award any marks.

## Question 5 (b) (ii)

This question proved to be quite discriminating, as it should be, given that it is based on the higher level content of the specification. There was a marked difference in the proportion of higher ability candidates who answered this well, compared to the less able candidates sitting this paper.

- (ii) Genetically different organisms contain different DNA codes that produce different proteins.

Describe the process that takes place in the nucleus during the first stage of protein synthesis.

(2)

The process that <sup>first</sup> takes place is transcription. It is when a single strand of DNA combines with ~~the~~ mRNA (messenger RNA) it then goes up the nucleus to the cytoplasm.



### ResultsPlus Examiner Comments

This candidate scored 1 mark for the reference to transcription. Unfortunately, although they knew that mRNA is involved, they implied that it is already present and not actually made during the process. This was the most frequent error seen.

- (ii) Genetically different organisms contain different DNA codes that produce different proteins.

Describe the process that takes place in the nucleus during the first stage of protein synthesis.

(2)

DNA in nucleus is too big to be taken out. Therefore DNA acts as a template to make ~~the~~ mRNA which moves out of the nucleus to the Ribosome. At first the DNA unwinds and unzips and base pairing <sup>ensures</sup> ~~ensures~~ its complementary. This is called transcription.



### ResultsPlus Examiner Comments

This is a good example of some of the excellent responses that we saw written by the more able candidates.



### ResultsPlus Examiner Tip

Your specification gives you a good summary of exactly what you need to know about a topic. Learn that and include it in your answer.

## Question 6 (b)

Candidates have good knowledge of the structure of red blood cells and how they are adapted for their function. It would improve candidate's responses if they could actually link each feature with the way it helps the red blood cell to carry oxygen.

(b) Describe how the structure of a red blood cell is related to its function.

(3)

The red blood cell is related to its function of carrying oxygen by: • Not having a nucleus so more haemoglobin can be put in the cell.  
• Being in a Biconcave disc shape so that ~~more disc~~ it has a larger surface area for more diffusion to happen.



**ResultsPlus**

**Examiner Comments**

This illustrates the kind of response that had been hoped for. A clear link between the structure and how it helps the cell to carry oxygen.

(b) Describe how the structure of a red blood cell is related to its function.

(3)

The red blood cell is <sup>shaped</sup> ~~a~~ <sup>up to a</sup> ~~bi-concave~~ <sup>bi-concave</sup> disc which means it has a larger surface area which means it can carry more oxygen. It also has no nucleus which means it can carry more haemoglobin - which also allows it to carry more oxygen and the cell is also flexible which means it can fit through any capillary.



**ResultsPlus**

**Examiner Comments**

Another well-constructed answer linking structure to adaptation.



**ResultsPlus**

**Examiner Tip**

Look at how many marks are allocated to an answer and then make at least that many points. This answer has been assigned 3 marks and the candidate has discussed three features.

(b) Describe how the structure of a red blood cell is related to its function.

(3)

- Biconcave which allows it to efficiently carry oxygen.
- No nucleus so it can carry more oxygen.
- Haemoglobin gives it the red colour and can bind with oxygen to form oxyhaemoglobin allowing it to carry oxygen more efficient.



**ResultsPlus**  
Examiner Comments

Another good answer; the use of bullet points helps to make the response clear.

(b) Describe how the structure of a red blood cell is related to its function.

(3)

the structure of the red blood cell is almost like a doughnut except it ~~is~~ ~~is~~ ~~is~~ doesn't have a hole in it it is like that so it is easy to transport and give oxygen to where it needs to be



**ResultsPlus**  
Examiner Comments

Less able candidates did refer to the doughnut shape of the cell and used terms like 'easy' and 'efficient'.



**ResultsPlus**  
Examiner Tip

Try to use technical terms.

## Question 6 (c)

Candidates displayed their knowledge of the role of platelets; good answers were seen scoring the maximum of two marks.

(c) Describe the function of platelets.

(2)

Platelets are small fragments of cells. They make blood clot over a wound to prevent bleeding.



**ResultsPlus**  
Examiner Comments

A typical answer, scoring 2 marks.

(c) Describe the function of platelets.

(2)

Platelet are small parts travel in the blood, and when ~~is~~ the organism ~~cuts themselves~~ <sup>has an open wound</sup> ~~over the area~~ they cause the blood to clot, to reduce blood loss and protect the organism for harmful microorganisms.



**ResultsPlus**  
Examiner Comments

Candidates frequently scored full marks for this question.



**ResultsPlus**  
Examiner Tip

It can be a good idea to try and write one more statement in your answer than there is marks for the question.

## Question 6 (d)

Very few blank responses were seen for this question. Some candidates wrote two descriptions, one for mitosis and one for meiosis, but examiners credited this by picking out the comparative points. More able students did write actual comparisons and there were some very clear comparisons made in a table format.

\* (d) Mitosis and meiosis are types of cell division.

Compare these two types of cell division.

(6)

- Mitosis happens to ~~every~~ every cell in the body except sex cell
- Meiosis happens only to sex cells
- Mitosis produces 2 identical daughter cells
- Meiosis produces four unidentical gametes
- Mitosis has only one division
- Meiosis has 2 divisions
- Mitosis happens to cells with 2 sets of chromosomes
- Meiosis happens to ~~cells~~ gametes which has one set of chromosomes



### ResultsPlus Examiner Comments

For a level 3 response, examiners were looking for at least two correct comparisons. This response is a very good level 3 response. The use of bullet points aids the clarity and is perfectly acceptable, provided more than just key words are listed.



### ResultsPlus Examiner Tip

You do not have to write large amounts to score well. Short snappy sentences, each containing one piece of information expressed using scientific terms, is a very clear way of expressing yourself.

\*d) Mitosis and meiosis are types of cell division.

Compare these two types of cell division.

(6)

Mitosis is a <sup>type of</sup> cell division that happens only asexually ~~and~~ whereas meiosis happens in sexual reproduction. ~~Another~~ A similarity is that both types of cell division begin with a cell that is diploid. However, from here, there is a difference. Mitosis produces 2 diploid cells that are genetically identical to the first cell that divided, ~~and~~ whereas ~~the~~ meiosis results in 4 haploid cells that are all genetically different to each other. The processes are very similar ~~but~~ the results are different.



**ResultsPlus**  
Examiner Comments

This is another example of some of the high quality answers that we saw.

\* (d) Mitosis and meiosis are types of cell division.

Compare these two types of cell division.

(6)

Mitosis -

It is used ~~mainly~~ for repair, growth as it divides into two cells and then divides further to have four daughter cells. The chromosomes are ~~then~~ divided and given to all daughter cells. The cells can ~~either~~ be haploid.

Meiosis -

Only used to make sex cells - gamete. The cells divide to make two daughter cells. The male/female cells are haploid and when combined together they are diploid now. As the diploid cell is now a normal set now at zygote. Each male/female is half so it's haploid.

(Total for Question 6 = 12 marks)



**ResultsPlus**  
Examiner Comments

Although this candidate has muddled up most of mitosis and meiosis, they have made one correct comparative statement about the two processes which makes this a level 2 response.

\*(d) Mitosis and meiosis are types of cell division.

Compare these two types of cell division.

(6)

Mitosis is the growth and cell division in all living things. The parent cell duplicates itself five to create two daughter cells which are exactly identical and carry out the same function. This is how growth occurs and is also constantly happening when cells die. Meiosis is a different type of cell division. When two gametes join in sexual reproduction they fuse to create a zygote. The zygote begins meiosis and the cells divide as it grows and becomes an embryo. Now the cell divide by mitosis as it divides further.



**ResultsPlus**  
Examiner Comments

For a level 1 response we were looking for at least two correct statements about cell division. Wrong explanations were ignored.



**ResultsPlus**  
Examiner Tip

Even if you know very little about the answer to a question, always write what you do know. You are guaranteed zero marks for a blank response but you might pick up marks if you write something.

\*d) Mitosis and meiosis are types of cell division.

Compare these two types of cell division.

(6)

Mitosis and meiosis both divide cells ~~in~~ into ~~haploid~~ haploid cells. Meiosis can reproduce asexually, which <sup>occurs</sup> in things like strawberry plants growing runners. Mitosis divides the cells so that sexual reproduction can occur. e.g. the sperm cell is divided to produce a haploid cell, and the same happens to the egg cell, and when the sperm fertilises the egg, it produces a diploid cell.



**ResultsPlus**

**Examiner Comments**

This is an example where the candidate also confused mitosis and meiosis but did not make any correct comments.

## Paper Summary

Overall, there were some good answers seen and many candidates displayed a good knowledge and understanding of this new B2 specification. Perhaps the weakest answers were those involving the practical work and the higher level content.

Teaching and candidate revision should focus on the following points:

- Learning and understanding the steps in practical procedures that are identified in the specification.
- Focusing on the higher level concepts.
- Accurate drawing of and reading from graphs.
- Using diagrams that illustrate structural features.
- Using comparative statements when asked to describe differences between two situations / processes.
- Focusing on the spelling of key biological terms.
- Showing working for all calculations and including units when relevant.

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