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Examiners' Report
June 2015

IAL Biology WBI01 01

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Introduction

This paper tested the knowledge and understanding of the two AS topics: 'Lifestyle, health and risk' and 'Genes and health', together with elements of How Science Works. The range of questions provided plenty of opportunity for candidates to demonstrate their grasp of these AS topics. On the whole, candidates coped well with this paper, finding most of the questions straightforward to tackle; indeed there were very few examples of questions not being attempted at all, with all questions achieving the full spread of marks.

It was pleasing to see how well many candidates could recall several areas of the specification in a good level of detail. It was also very pleasing to see very few candidates losing marks for poor quality of written communication (QWC) with many candidates producing clear answers, set out in a logical style with key biological terms spelt correctly.

Some candidates let themselves down by not reading the questions carefully enough, or by providing a response without the detail required at this level.

Many candidates have clearly made good use of past papers and mark schemes, but it is important for candidates to understand the scientific principles covered in the specification so they can apply them to new contexts and not write a rehearsed answer to a question that has been asked in the past.

Question 1 (b) (i)

(i) Using the information in the table, describe the effect of heparin concentration on blood clotting time.

(3)

The ~~concentration~~ blood clotting times for concentrations of 0·0 and 0·5 are steady at 30·1 AU. Further increases in heparin concentration after 0·5 AU lead to a decrease in blood clotting time. This occurs till 2·0 AU. Further increase in heparin concentration after 2·0 AU leads to increases in blood clotting time. The largest increase and also the largest change in blood clotting time occur between 3·0 and 4·0 AU, an increase of 147·4 seconds.

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Examiner Comments

In this response, the candidate identified the two main trends in the data gaining mark points 2 and 3. The candidate gained a third mark for noting that 0.5(au) of heparin had no effect on clotting time.

Question 1 (b) (ii)

The majority of candidates found this question straightforward and provided sensible answers.

Question 1 (b) (iii)

This question was answered well by candidates who recognised that heparin is an anticoagulant and thus increased the risk of excess bleeding.

Question 2 (a)

Candidates were asked to use information in the figure to explain why the molecules were classed as monosaccharides. The idea of mono meaning a single unit gained a mark and two marks were available for the idea that saccharides are comprised of C, H and O with the ratio 1:2:1.

Many candidates referred to single molecules or single sugars, rather than single **units**, these responses were not accepted. A molecule is a group of atoms covalently bonded together, so disaccharides, etc are single molecules. Maltose and starch are made from a single type of sugar.

(a) Use the information in the diagrams to explain why these two molecules are classed as monosaccharides.

(2)

They are called monosaccharides because only 1 sugar unit is present and no glycosidic bonds are present.

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Examiner Comments

The candidate gained one mark for this response (MP2). The two statements made, monosaccharides are single sugar units and the absence of glycosidic bonds, were considered to be equivalent.

(a) Use the information in the diagrams to explain why these two molecules are classed as monosaccharides.

(2)

Because ~~it~~ they are both single sugar units, and consist of carbon, hydrogen and oxygen in the form of a hexose ring, and ~~has~~ fits the formula $(CH_2O)_n$, as they have the formula $C_6H_{12}O_6$

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Examiner Comments

In this response, the candidate has clearly explained what the term monosaccharide means by addressing all three available marking points - gaining a maximum of two marks.

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Examiner Tip

Take care when using scientific terms, such as molecule, they generally have a very specific meaning.

Question 2 (b)

In this question candidates were asked to describe differences between the two molecules shown. The majority of candidates gained both marks for making clear reference to the different arrangement of groups on carbons 1 and 4.

Question 2 (c) (ii)

This question was answered well by a large number of candidates, often satisfying all four available marking points to gain a maximum mark of three.

(ii) Describe how these two monosaccharides join to form this carbohydrate.

(3)

The 2 monosaccharides of α glucose and galactose form lactose through condensation, with removal of water molecules. This carbohydrate formed is ~~disaccharides~~ disaccharides and can be converted back through hydrolysis. 2 monosaccharides form bond together.

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Examiner Comments

In this response the candidate gained two marks (MP3 and 4) for clearly expressing the idea that a condensation reaction takes place, which involves the elimination of water. Reference to a bond forming (line 6) was not sufficient for the first marking point - candidates needed to identify the type of bond formed.

(ii) Describe how these two monosaccharides join to form this carbohydrate.

(3)

Two monosaccharides join together in a reaction called the condensation reaction. It involves the ~~remo~~ removal of a water molecule and a disaccharide is formed. ~~The~~ & The bond formed between the two monosaccharides is called the 'glycosidic bond'

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Examiner Comments

In this, clearly expressed, response the candidate gained full marks (MP 1, 3 and 4). The candidate could have improved the answer by giving more detail of the glycosidic bond formed i.e. 1,4 glycosidic bond.

Question 2 (c) (iii)

This question was answered well by a number of candidates however, many found it challenging. Candidates often simply repeated themselves throughout their response - enzymes are specific, enzymes have specific active sites and enzymes recognise specific substrates. Responses such as this often scored only one mark (MP1). To gain higher marks candidates needed to explain the idea of enzyme specificity, so they needed to make reference to the shape of the active site (MP2), allowing only certain substrates to bind (MP3). The final marking point was available to candidates who made it clear that glucose and galactose have different shapes so require different enzymes (MP4) - generic statements that enzymes recognise substrates of different shapes were not accepted for MP4.

(iii) An enzyme is involved in the formation of this carbohydrate. A different enzyme is involved in the formation of a carbohydrate made from two glucose molecules.

Explain why different enzymes are involved in the formation of these different carbohydrates.

(3)

made up of
Enzymes, ~~have~~ different folding of proteins. Therefore, different 3
three dimensional ~~folding~~ arrangement formed causing ~~differe~~ them
to have different active sites. These active sites are ~~sp~~ highly
specific to substrates which can bind to them to form enzyme-substrate
complex. Thus, ~~en~~ specific enzyme can catalyse specific substrate only.

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Examiner Comments

In this response the candidate has expressed the idea that enzymes are specific (MP1) and that only certain substrates can bind (MP3). Although they implied that different enzymes have a different shape they did not clearly express the idea that active sites have different shapes and they made no reference to glucose and galactose having different shapes so did not gain MP2 or MP4.

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Examiner Tip

When you come across terms such as specificity make sure you understand what they mean. If you find that you are frequently using the same term in an answer think about whether you need to explain what the term means rather than just repeating the term.

(iii) An enzyme is involved in the formation of this carbohydrate. A different enzyme is involved in the formation of a carbohydrate made from two glucose molecules.

Explain why different enzymes are involved in the formation of these different carbohydrates.

(3)

- Different enzymes have different active site.
- Different active site have different shape.
- The reactant ~~with~~ only which can fit into active site can be catalyst.
- So one kind of ~~the~~ enzymes can catalyst ~~one~~ specific reaction.
- The reactant are different, so need ~~two~~ different enzymes.
- the shape of enzyme are also different.

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Examiner Comments

In this response the candidate gained all three available marks -line 2 (MP2), line 3 (MP3) and line 5 (MP1).

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Examiner Tip

Bullet pointing, either in planning or in producing your response, can help you quickly check that you have fully answered the question.

(iii) An enzyme is involved in the formation of this carbohydrate. A different enzyme is involved in the formation of a carbohydrate made from two glucose molecules.

Explain why different enzymes are involved in the formation of these different carbohydrates.

(3)

Because each enzyme have a different three-dimensional structure which leads to a different shape of active site so ~~form a~~ different substrates can fit into the active sites forming different carbohydrates.

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Examiner Comments

In this response the candidate has expressed the idea that enzymes have different shaped active sites (MP2) and that only certain substrates can bind (MP3). The candidate did not clearly express the idea that glucose and galactose have different shapes, nor used the term specific so did not gain MP1 or MP4.

Question 2 (d)

Many candidates were able to give two differences between monosaccharides and polysaccharides. However, as in question 2(a) a number were confused by the idea of molecules and sugars. Responses such as, a monosaccharide is made from one sugar and a polysaccharide is made from many sugars, were not accepted.

(d) Give **two** differences between a monosaccharide and a polysaccharide.

(2)

1 Monosaccharide cosists of only one sugar unit whereas Polysaccharide is made up of many sugar units linked together.

2 monosaccharide doesnt have glycosidic bonds whereas polysaccharide has glycosidic bonds between the sugar units.

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Examiner Comments

In this response the candidate has clearly given two differences between monosaccharides and poly saccharides (MP 6 and 4) gaining both marks.

Question 3 (a)

Relatively few candidates were able to provide a reasonable description of the structure of a fibrous protein. Many candidates gave detailed descriptions of globular proteins (enzymes) that failed to gain credit.

(a) Describe the structure of a fibrous protein.

(3)

A fibrous protein is a long straight chain which is made up of a sequence of amino acids joined by peptide bonds ~~during~~ by condensation reaction

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Examiner Comments

In this response the candidate gained one mark for a description of fibrous proteins as being long (MP1). The description of bonding between amino acids does not refer to cross-linking and does not gain MP5.

(a) Describe the structure of a fibrous protein.

(3)

A ~~fibric~~ fibrous protein is composed of many polypeptide chains running parallel to each other. They have cross links in betweens in the form of disulfide bridges and hydrogen bonds which hold the structure together and gives it a rope like shape. They are tough and have a repeated sequence of amino acids. They resist stretching and can be used for structural purposes.

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Examiner Comments

In this response the candidate has gained all three available marks. Two marks for a description that includes reference to polypeptides parallel to each other (MP4) with crosslinking between the chains (MP5). The candidate also makes reference to the repetitive amino acid sequence commonly observed in fibrous proteins (MP2) for a third mark.

Question 3 (b)

A number of candidates were able to apply their understanding of mutations to the context of the question and provide good answers. Many other students simply reproduced answers that described the effect of mutations on enzymes. For the first marking point candidates needed to describe mutations in DNA or a gene. Marking point 4 required reference to a change in shape or strength of the protein.

(b) Suggest how a mutation could cause the structure to be altered.

(3)

A change in base sequence of DNA will lead to a change in the sequence of amino acids formed. This will lead to different bonding between structures. As a result, changing the shape of the structure of the protein.

, like hydrogen bonding, ionic bond, disulphide bonding,

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Examiner Comments

This candidate has provided a good response that addresses all four available marking points and gains the maximum three marks.

(b) Suggest how a mutation could cause the structure to be altered.

(3)

Mutations occur in the bases of genes. Certain bases might be missing, duplicated, replaced therefore changing the sequence of the base which when transcription and translation occur will change the sequence of amino acids fused and therefore alter the protein.

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Examiner Comments

This response gained two marks. One mark for a description of a change in the bases of a gene (lines 1 -3). A second mark was given for the change in amino acid sequence (line 5). Statements such as 'alter the protein' (line 6) are not sufficient for marking point 4.

Question 3 (c)

Some candidates produced good response to this question gaining all three available marks. However, a number of candidates struggled to express themselves clearly and a number produced responses that focussed on the elastic properties of arteries.

(c) One problem associated with EDS is a weakening of the structure of the arteries. This may cause arteries to rupture (burst).

Suggest why an alteration in the structure of collagen, or less collagen being produced, could cause arteries to rupture.

(3)

Collagen is a fibrous protein and it has a role towards the ~~that~~ structural properties of the artery. Colagen will strengthen the ~~arteries~~ wall of arteries to withstand the high pressure of blood flowing through it. When less collagen being reduced due to mutation, the wall of arteries cannot have enough collagen, therefore the wall of arteries will be weakened.

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Examiner Comments

In this response the candidate gained all three marks. Clearly identifying collagen as a component of the artery wall (MP2) where it provides strength (MP3) to the artery wall gains two marks. The third mark is for describing the high pressure in the arteries (line 3).

(c) One problem associated with EDS is a weakening of the structure of the arteries. This may cause arteries to rupture (burst).

Suggest why an alteration in the structure of collagen, or less collagen being produced, could cause arteries to rupture.

(3)

The collagn fibles which are present in arteries help for the elasticity and stretching and ~~for~~ re-coiling of the walls due to high blood pressure in the arteries So if there is less collagn the artery wont be able to withstand these high pressures and can rupture.

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Examiner Comments

In this response the candidate gained mark point 1 and 3 - recognising that collagen is present in the artery wall and that the blood pressure is high. The candidate confuses collagen with elastic fibres with a role in stretching and recoil rather than in providing strength so does not gain the third mark point.

Question 3 (d)

Many candidates provided good responses to this question, often gaining all four available marks from a clearly annotated genetic diagram.

(d) One form of EDS is caused by a recessive allele.

Explain how parents who are both heterozygous for this form of EDS could calculate the probability of having a child with the disorder.

(4)

using a genetic diagram, for example a punnett square, using their genotypes to predict that of their potential children. EDS is caused by a recessive allele so for example 'E' may be normal and 'e' may be EDS, both parents have the genotype 'Ee'.

so the punnett square would be as shown:

♀ \ ♂	E	e
E	EE	Ee
e	Ee	ee

EE = Normal

Ee = carrier

ee = has EDS

This diagram shows that although there is a 25% chance their child is fine and not a carrier, there is a 50% chance their child is an EDS carrier, and 25% they have EDS.

(Total for Question 3 = 13 marks)

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Examiner Comments

In this response the candidate has clearly addressed marking points 1, 3, 4 and 5. Although, gametes produced by each parent are implied in the Punnet square, the response could be improved by more clearly identifying them as gametes.

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Examiner Tip

When using genetic diagrams clearly identify the relevant gametes and genotypes.

Question 4 (a)

The graph used in this question is a little unusual. It shows the relationship between diastolic and systolic blood pressure and CVD death rate. Many candidates were able to identify the key relationships and gained all three available marks. Candidates who tried to describe each individual change or manipulate data generally did less well. MP1, 3 and 5 were the most frequently observed marking points. MP 2 was rarely seen.

(a) Using the information in the graph, describe the effects of diastolic blood pressure and systolic blood pressure on CVD death rate.

(3)

As the diastolic blood pressure ~~and the~~ increases, so does the CVD ~~heart~~ death rate. As the systolic blood pressure increases, the CVD death rate also increases. CVD death rate is more affected by systolic blood pressure than diastolic. A systolic blood pressure of >21.2 kPa has the highest CVD death rate.

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Examiner Comments

In this response the candidate clearly described the effect of increasing diastolic and systolic blood pressure on death from CVD (MP1 and 3). A third mark was given for the recognition that an increase in systolic blood pressure has greater influence than increasing diastolic pressure (MP4). The last sentence would not have gained mark point 5 since the candidate did not make reference to the diastolic pressure being <9.3.

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Examiner Tip

When asked to describe the data in a graph or table make sure you identify any general trends before describing different components of the data. Look at the number of marks available and make sure you make at least one valid comment for each mark point.

Question 4 (b)

Many candidates appear to have a good understanding of the role of atherosclerosis in CVD. Candidates frequently produced good answers which linked high blood pressure to damage of the endothelial lining of arteries and the subsequent development of atheroscleosis. A number of candidates described a narrowing of the artery, this was not accepted as being equivalent to narrowing of the lumen of the artery (MP4).

(b) Explain why high blood pressure increases the risk of CVD.

(3)

High blood pressure damages the endothelium of the artery. This leads to an inflamatory response by the body which forms a plaque at the site of damage by white blood cells accumulating cholesterol and this hardening via calcium ions. This plaque restricts blood flow and leads to atherosclerosis, a CVD.

Thus high blood pressure increasing the risk of CVDs occuring.

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Examiner Comments

In this response the candidate gained a maximum of three marks for identifying high blood pressure as a cause of damage to the endothelium (MP1) and then describing the role of the inflammatory response (MP2) leading to plaque formation (MP3).

Reference to plaque reducing blood flow by itself would not be sufficient for MP5. To gain this mark the response needs to make reference to a reduced blood supply to cells. However, the preferred response would describe cells or tissues being deprived of oxygen or nutrients.

Question 4 (c)

This question was answered well by many candidates. A number of candidates provided a response describing more than two factors. This usually had no adverse consequence i.e. when the first two factors were correct. However, on occasion candidates provided more than two factors with one of the first two being incorrect, as examiners mark the response in list order, the consequence is that candidates would not get both marks.

(c) State **two** factors that increase blood pressure.

(2)

1 high alcohol intake

2 obesity and smoking

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Examiner Comments

In this response the candidate gained one mark for obesity in the second line (MP7). High alcohol intake was incorrect and did not gain a mark. Smoking is a correct suggestion but it is the third factor listed and the candidate has already had two attempts at the answer, one of which was incorrect.

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Examiner Tip

Take care when asked to state a factor. If you list more than one factor on the response line the examiner will mark the first factor given. So if you give two factors and the first is incorrect but the second correct you may not gain any credit.

Question 5 (a)

Relatively few candidates gained full marks for this question. The majority of candidates were able to suggest that enzymes lowered the activation energy for a reaction (MP2). Few explained that enzymes were catalysts or that they were not used up in the reaction (MP1 and MP3). Only occasionally did candidates describe the process of products detaching from the enzyme to allow new substrates to bind (MP4 and 5). Catalase had large number of active sites.

5 Catalase is an enzyme found in many tissues. Catalase breaks down hydrogen peroxide into water and oxygen.

One molecule of catalase can break down millions of molecules of hydrogen peroxide in one second.

(a) Suggest why one molecule of catalase can break down hydrogen peroxide so quickly.

(3)

Catalase is an enzyme & this means that it is a biological catalyst which speeds up the reaction by decreasing the activation energy barrier. As catalase contains only 1 active site so it can quickly break down the first molecule of H_2O_2 and which is then released and so the other molecules can bind one by one to increase the amount of H_2O and O_2 produced.

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Examiner Comments

In this response the candidate has identified catalase as a biological catalysts (MP1) that lowers the activation energy for a reaction (MP2). The candidate then goes on to describe the process of product being released and new substrate binding (MP4 and 5).

5 Catalase is an enzyme found in many tissues. Catalase breaks down hydrogen peroxide into water and oxygen.

One molecule of catalase can break down millions of molecules of hydrogen peroxide in one second.

(a) Suggest why one molecule of catalase can break down hydrogen peroxide so quickly.

(3)

Catalase is an enzyme & this means that it is a biological catalyst which speeds up the reaction by decreasing the activation energy barrier. As catalase contains only 1 active site so it can quickly break down the first molecule of H_2O_2 and which is then released and so the other molecules can bind one by one to increase the amount of H_2O and O_2 produced.

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Examiner Comments

In this response the candidate has made reference to catalase lowering the activation energy (twice) (MP2) and to the enzyme being unchanged which was accepted as being equivalent to not used up (MP3).

Question 5 (b) (ii)

A number of candidates produced good response to this question gaining all 6 available marks. However, many struggled to describe a sensible experiment.

*(ii) Describe an experiment to investigate the effect of cooking on catalase activity in potatoes.

(6)

Cut one potato into two halves. Cook one half and the other has to be uncooked. After cooking cut the two potatoes into cubes of the same size and surface area. Put each ~~cub~~ the same number of cubes in the same volume and concentration of hydrogen peroxide. Keep the two beakers in the same temperature. Then measure volume of oxygen produced from each group per unit time. Plot the results and measure the initial rate of the reaction of both ~~experer~~ experiments by measuring the gradient of the line. Repeat the expirement and find the mean volume of oxygen produced per unit time. Compare the results and find the effect of cooking.

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Examiner Comments

In this response, the candidate has gained a maximum of six marks. Using the same potato and comparing cooked with uncooked potato gets MP2 and 1 (lines 1and 2). Using cubes of the same surface area and controlling the concentration of hydrogen gets MP 3 and 4 (lines 3-5). Controlling the temperature for the enzyme reaction gets MP7 (line 5 -6). Measuring the volume of oxygen produced per unit time gains MP5 and 6 (lines 6 -7). Repeating to find mean values gains MP8 and plotting graphs to find the initial rates that can then be compared gains MP9 (lines 8-12).

Question 6 (a)

Relatively few candidates gained all three available marks for this question. Most candidates were able to describe the use of uracil in place of thymine in RNA production (MP2) but went no further in comparing the molecules produced. In many responses the candidates did not make a comparison, simply stating the situation for either transcription or translation.

6 (a) The diagram below shows part of a template (antisense) DNA strand.

A	G	C	G	C	T	T	G	C

DNA replication and transcription will produce different molecules from this DNA strand. Compare the molecules that will be produced, from this strand of DNA, by DNA replication and by transcription.

(3)

During DNA replication the strand that will be produced will be TCGCGAACG as these are complementary base pairs. However, during transcription, Thymine is replaced with Uracil, therefore, it will produce a strand of UCGCGAACG.

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Examiner Comments

In this response the candidate has clearly expressed the idea that thymine is used in DNA replication and uracil in mRNA in transcription. However, no other comparisons are made so only one mark was awarded.

6 (a) The diagram below shows part of a template (antisense) DNA strand.

A	G	C	G	C	T	T	G	C

DNA replication and transcription will produce different molecules from this DNA strand. Compare the molecules that will be produced, from this strand of DNA, by DNA replication and by transcription.

(3)

A DNA strand will be produced during DNA replication and will consist of the complementary bases to the above strand ie- TCGCGAACG as per the complementary base pairing rule. This will form a complete DNA molecule.

An mRNA strand will be produced during transcription and will consist of similar complementary bases with the exception of uracil replacing thymine. This will form a singular mRNA strand with ribose sugar as opposed to deoxyribose in DNA.

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Examiner Comments

In this response, the candidate has clearly compared several aspects of the molecules produced by replication and transcription and gained three marks (MP1, 2 and 3).

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Examiner Tip

When asked to compare, you must make a comment on each of the factors being compared. In this question, you must describe both the DNA and the RNA molecules produced.

Question 6 (b)

Many candidates demonstrated a good understanding of translation and produced good responses to this question. Some candidates started their answer by providing detailed descriptions of transcription, which was not required.

*(b) Translation follows transcription.

Describe how translation produces a polypeptide chain, using the code from this template strand of DNA.

(6)

The mRNA strand with the complementary bases will leave the nucleus following transcription and will attach onto ribosomes (on RER or in the cytoplasm). tRNA molecules containing an amino-acid binding site and an anticodon will bind on the mRNA strand. As one tRNA molecule carrying an amino-acid approaches, it binds with its anticodon onto the codon on the mRNA strand. Another tRNA molecule, carrying an amino-acid will follow and bind on to the next triplet of bases. The neighbouring amino acids will join with a peptide bond following a condensation reaction and the tRNA is free to leave. The process continues until a stop codon is found. The chain then detaches from the ribosomes and enters the RER for protein modification.

(Total for Question 6 = 9 marks)

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Examiner Comments

This is an example of a good response for which the candidate gained five of the six available marks. mRNA leaving the nucleus and attaching to a ribosome gained MP3 and 4 (lines 1-3). tRNA bringing amino acids to the mRNA and anticodon - codon interactions gained MP6 and 7 (lines 5 and 6). The formation of peptide bonds between adjacent amino acids gains MP8 (lines 8-9).

Question 7 (a)

Many candidates were able to explain how to calculate the mean increase in heart rate and gained all three available marks. Some candidates went on to calculate percentage increases. This was not penalised on this occasion if the candidate had previously described how to calculate the mean increase in heart rate.

(a) Describe how these results could be used to calculate the mean increase in heart rate.

(3)

mean resting heart rate = sum of resting heart rates / number of students

mean after caffeine rate = sum of caffeine heart rates / number of students

∴ mean(resting) − mean(caffeine) = mean increase

$\frac{75+79+60}{3} - \frac{98+84+72}{3} = \frac{214}{3} - \frac{244}{3} = -10$

↓

heart rate increase of 10 (bpm)

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Examiner Comments

In this response the candidate has clearly shown how to calculate the mean increase in heart rates and gained all three available marks.

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Examiner Tip

When asked to explain how to carry out a calculation it can help to show the calculation as well as describe it.

Question 7 (b)

Many candidates recognised that to improve reliability required repeats. To gain marks they need to describe were the repeats came from. Using more students (MP1) or repeating the investigation on each student (MP2). Simple stating 'repeat the experiment' or 'do more repeats' was not sufficient.

(b) Describe how the reliability of this investigation could be increased.

(2)

By repeating the experiment three times for each student to find the ~~average~~ average and using more than the number of students as a sample.

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In this response the candidate has clearly satisfied both mark points.

(b) Describe how the reliability of this investigation could be increased.

(2)

Increase the sample size by selecting more students for this experiment.
Repeat the experiment with different age groups of students.

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Examiner Comments

In this response the candidate has recognised the need to use more students (MP1). However, the candidate then makes the same point by suggesting using more students of different ages. If they had suggested repeating the experiment on the same students they would have gained the second mark (MP2).

Question 8 (b) (i)

The majority of candidates described differences between peak flow rate in males and females but did not attempt to provide any explanation.

(i) Using the information in the graph, describe the difference in peak flow rate of men and women of the same height.

Suggest an explanation for this difference.

(3)

The graph shows that men ~~a~~ have higher peak flow rate than women of same height for all years. The greatest difference is seen from 25 to 45 where men reached flow rate of above 660 ~~cubic~~ $dm^3 min^{-1}$ which is max for all ages of men while women reached only above 450 $dm^3 min^{-1}$ at max for any age.

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Examiner Comments

The candidate only gained one mark for this response. The description of the difference between males and females gained one mark (MP1). The candidate completely ignored the part of the question asking for an explanation.

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Examiner Tip

Read questions carefully and make sure you understand what you are being asked to do before attempting to answer them.

(i) Using the information in the graph, describe the difference in peak flow rate of men and women of the same height.

Suggest an explanation for this difference.

(3)

The peak flow rate in both men and women follow the same trend throughout the years. Both increase between 15 and 30 years old and both decrease between 35 and 85 years old. However, the peak flow rate is approximately 1·4 times higher for men than women of the same height. Also, the peak flow rate increases up to about 35 years in men but 30 years in women. This could be because men have larger lungs that can fill up with more air than women, allowing a ~~larger r~~ higher rate of air flow.

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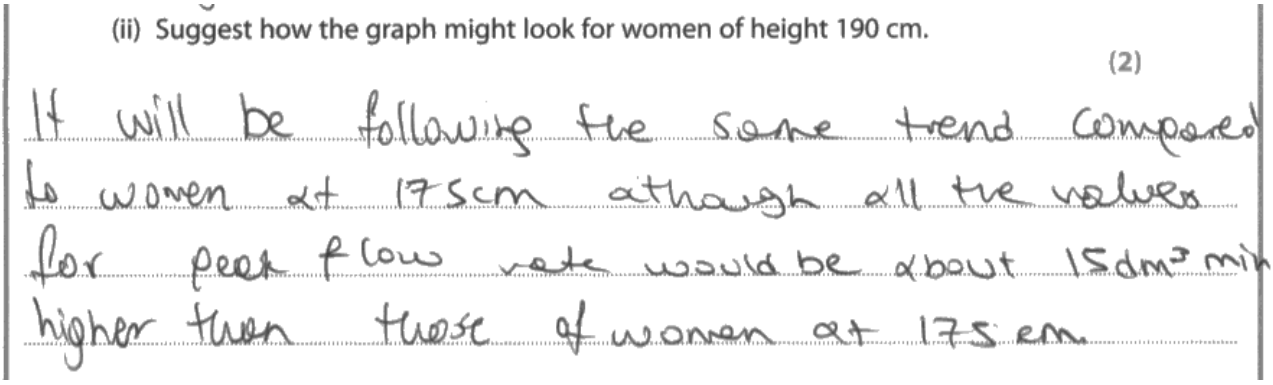
Examiner Comments

This candidate gained all three available marks. Two marks for the comparison of PFR between males and females (MP1 and 2) and one mark for attempting an explanation (MP3).

Question 8 (b) (ii)

Most candidates provided reasonable description of the curve expected for women of 190 cm height. Some drew the curve on the graph which was accepted.



(ii) Suggest how the graph might look for women of height 190 cm.

(2)

It will be following the same trend compared to women at 175cm although all the values for peak flow rate would be about 15 $dm^3 min^{-1}$ higher than those of women at 175 cm.

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Examiner Comments

In this response the candidate has given a good description that gained both marks.

Question 8 (c)

In this question candidates are asked to explain why the peak flow rate is lower in individuals with cystic fibrosis. Whilst numerous good examples were seen many candidates produced answers that made reference to reduced gas exchange. In many cases it was not clear if the candidates simply ignored the question or that they believed a reduced rate of gas exchange results in a reduced peak flow. A number of candidates did not clearly the express the idea that the CTFR protein does not function properly often simply making reference to a mutated CFTR channel or protein. Examiners were looking for reference to a mutated CFTR gene (MP1) and a CFTR protein or channel that did not function properly (MP2).

(c) People with cystic fibrosis have a reduced rate of gaseous exchange and lower peak flow rates than people who do not have this condition.

Explain why people with cystic fibrosis have a lower peak flow rate.

(4)

It is because their CFTR ~~channle~~ ~~tha~~ carrier protein is not functioning properly. As a result Cl^- ions are not able to diffuse out and more Na^+ ions ~~a~~ move into the cell. This results ~~in~~ the mucus to become thick and less runny. This thick mucus are at the lining of the airway which makes it hard for the oxygen to diffuse into the body. The gaseous ~~ext~~ exchange process is slow down because of this and they therefore have a lower peak flow rates.

ResultsPlus
Examiner Comments

In this response the candidate gained a maximum of four marks. In lines 1 -4 the candidate expresses the idea that the CFTR protein does not function properly and as a consequence chloride ions cannot diffuse out of the cells (MP2 and 3). The candidate then goes on to describe the accumulation of thick mucus in the lining of the airways (MP4 and 5).

The description of the effect of thick mucus on gas exchange was ignored and would not have gained any credit on this occasion. Although correct biology, it was not relevant to the question asked. Candidates were asked to explain the reduced peak flow rate not reduced gas exchange.

ResultsPlus
Examiner Tip

Read questions carefully and make sure you answer the question asked.

Paper Summary

Based on their performance on this paper, candidates are offered the following advice:

- Read the whole question carefully, including the introduction, to help relate your answer to the context used. You should read the question through carefully at least once and then write down your knowledge and understanding in a way that answers the question.
- Don’t assume that the question asked is the same as that which has appeared on a previous paper.
- Read your answers back carefully – do they answer the question, have you made at least as many clear points as marks are available.
- mentions both things being compared.
- When asked to describe a trend this is asking for the overall changes and not a detailed description of individual points on a graph or in a table.
- Include a relevant calculation whenever you are asked to describe or compare numerical data in tables or graphs.
- Don’t be afraid to include a sketch diagram or graph if it will help add clarity to your answer.
- When describing the measurement or control of variables, be specific about what is to be measured e.g. volume or mass, and avoid vague terms such as amount.
- Pay particular attention to spelling, the use of technical names and terms, and organisation of your answer in QWC labelled extended writing questions.
- Explore and assess examples of candidate responses from this report to help you understand what makes a good response to different types of questions, and exemplify the level of knowledge and understanding expected at AS level.

Grade Boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:

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