Examiners' Report
Lead Examiner Feedback

January 2021

Pearson BTEC Nationals
In Health and Social Care (31493H)
Unit 3: Anatomy and Physiology

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Introduction

- LE Report to be considered with the live external assessment and corresponding mark scheme
- The unit is anatomy and physiology in the context of health, including an overview of a selection of physiological disorders. There is also a section on research as applied to physiological disorders.

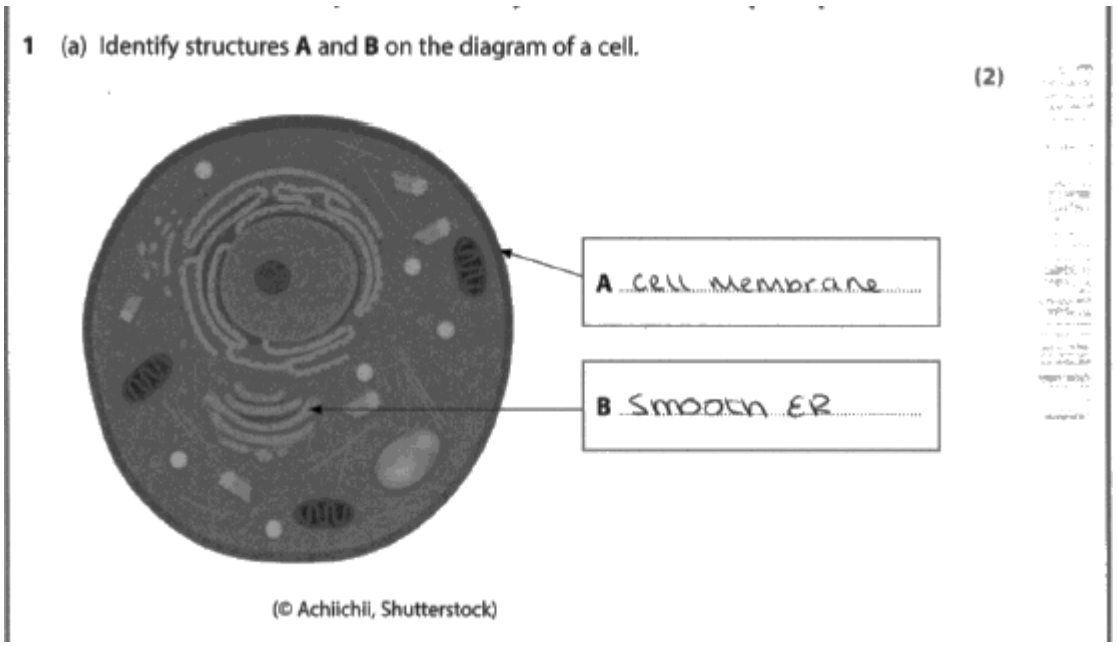
Introduction to the Overall Performance of the Unit

The paper performed as intended, differentiating between the learners, and allowing the more able learners to demonstrate their knowledge of the subject matter included in the specification. As was expected this series there were times when the learners were not familiar with areas of the specification, although the more able learners could apply previous knowledge from e.g., GCSE science and gain marks in questions. In some areas, where the learners had no previous knowledge of the subject matter there were some very creative answers produced, these occasionally gained some marks, and the learners are to be commended for attempting questions where it was obvious that they had little familiarity with the subject matter.

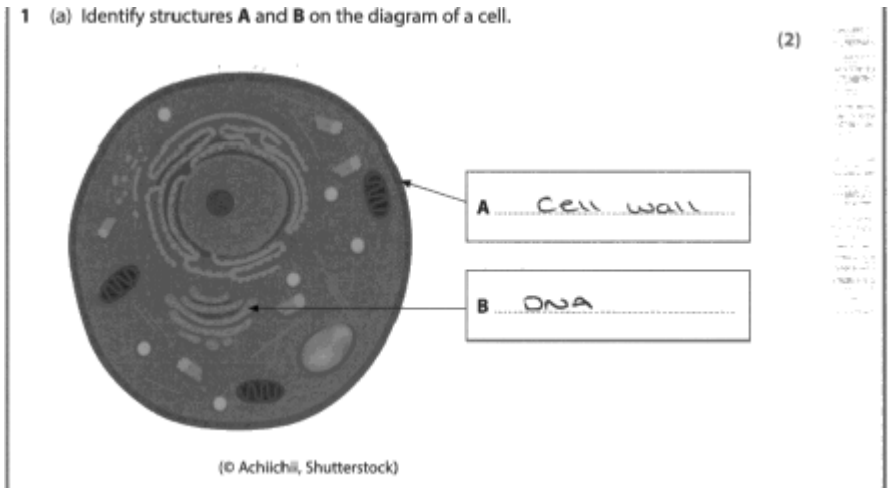
Individual Questions

1(a)

The command verb is identify so 2 structures was all that was needed. This response demonstrates the correct answers.

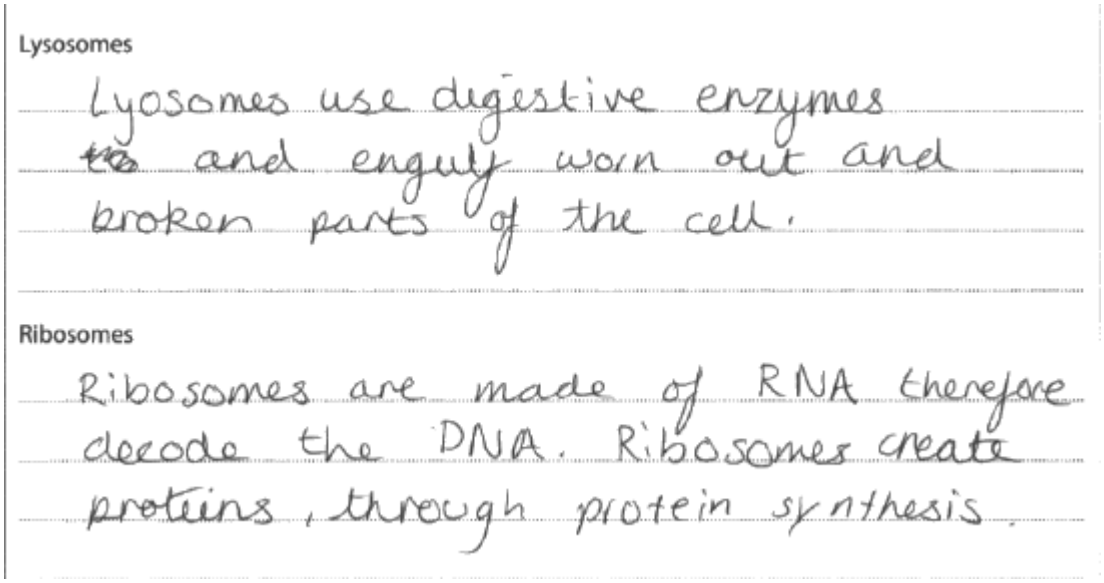


This response demonstrates a common incorrect answer where the cell membrane has been labelled as the cell wall (not found in animal cells) and a guess has been made at the second identification.

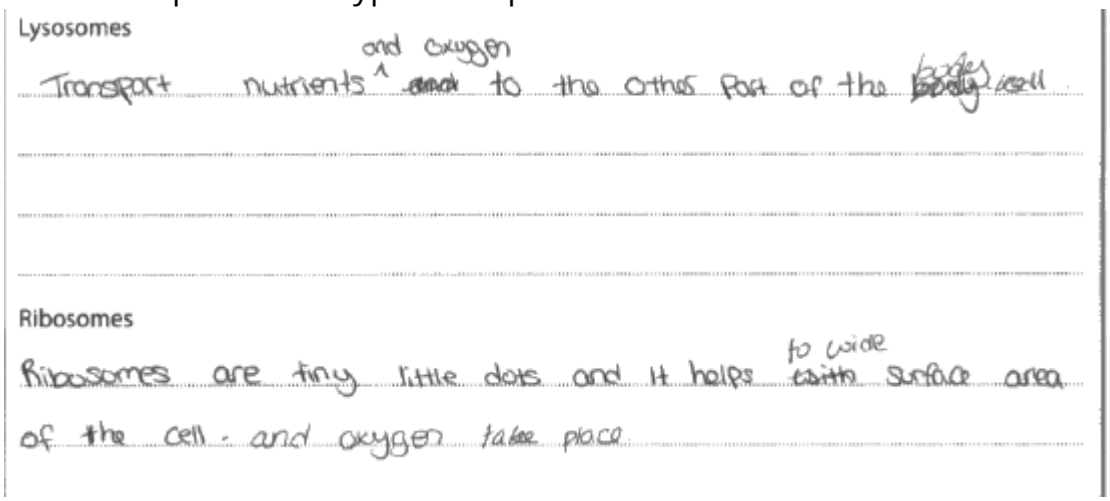


1(b)

The command verb is outline, this means a short description and there were 2 marks for each organelle so 2 points needed to be made about each.
This response demonstrates a good response about lysosomes, the response about ribosomes identifies protein production. Although they contain RNA, that is not part of their role and the comment about DNA is incorrect.



Many responses seen were incorrect responses related to other organelles and showed an unfamiliarity with the specification area. This is an example of that type of response.



1(c)

This question was also an outline question. The chemical equations would have been enough to gain full marks, this approach was rarely seen and even more rarely seen accurately. This is an example of the type of correct answers that were seen.

Aerobic respiration

Aerobic respiration uses oxygen to create energy. It occurs in the mitochondria. Oxygen + glucose → carbondioxde + water (+energy)

Anaerobic respiration

Anaerobic respiration happens when there is none of very little oxygen available to create energy. It occurs in the cytoplasm. glucose → lactic acid (+energy)

(Total for Question 1 = 10 marks)

Several learners knew the answers had something to with oxygen but could not recall the detail, many learners also get respiration confused with ventilation and circulation. This response demonstrates all three of these misconceptions.

(c) Outline aerobic respiration and anaerobic respiration.

(4)

Aerobic respiration

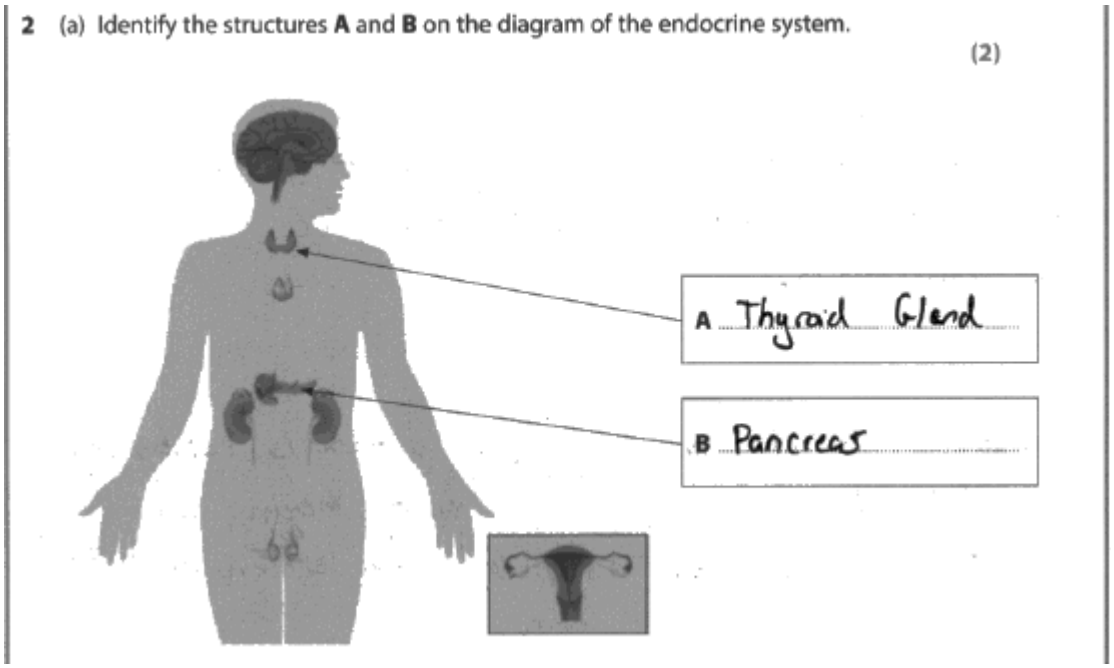
Aerobic respiration is the point at which the body is intaking oxygen. The heart beat may start to get faster.

Anaerobic respiration

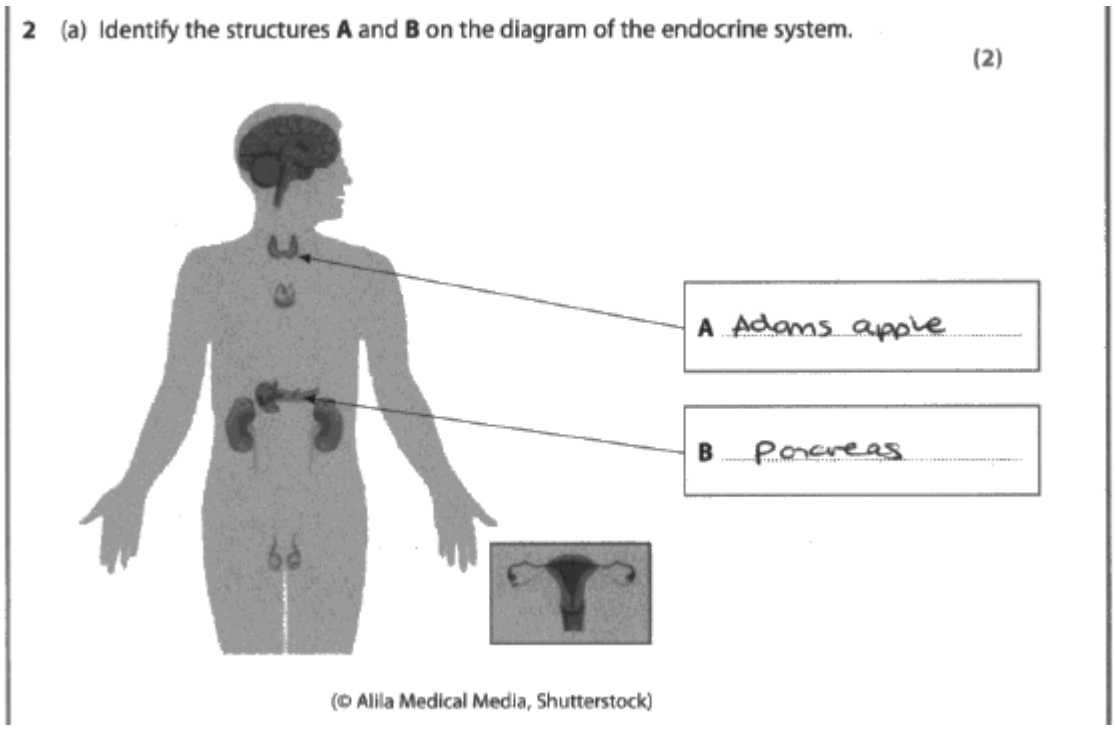
Anaerobic respiration is when the body relaxes and is releasing oxygen. The heart beat may start to slow down and regulate.

2(a)

Some learners could recall the correct endocrine glands, as demonstrated here.

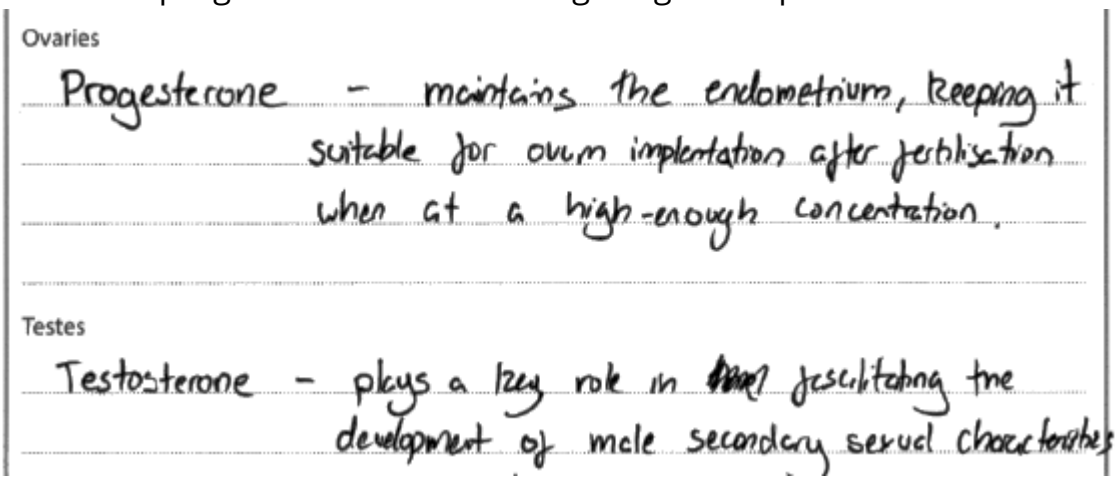


The location of the pancreas was familiar to many learner but a lot did not know the thyroid, and rather than guessing another endocrine gland they ended to identify another structure in that area of the body, larynx, trachea and Adam's apple were all seen as here.



2(b)

This question was well answered, the most common answer being oestrogen, regulating periods/secondary sexual characteristics. and testosterone for secondary sexual characteristics. Several learners identified progesterone as here and gave good expansions.



Ovaries

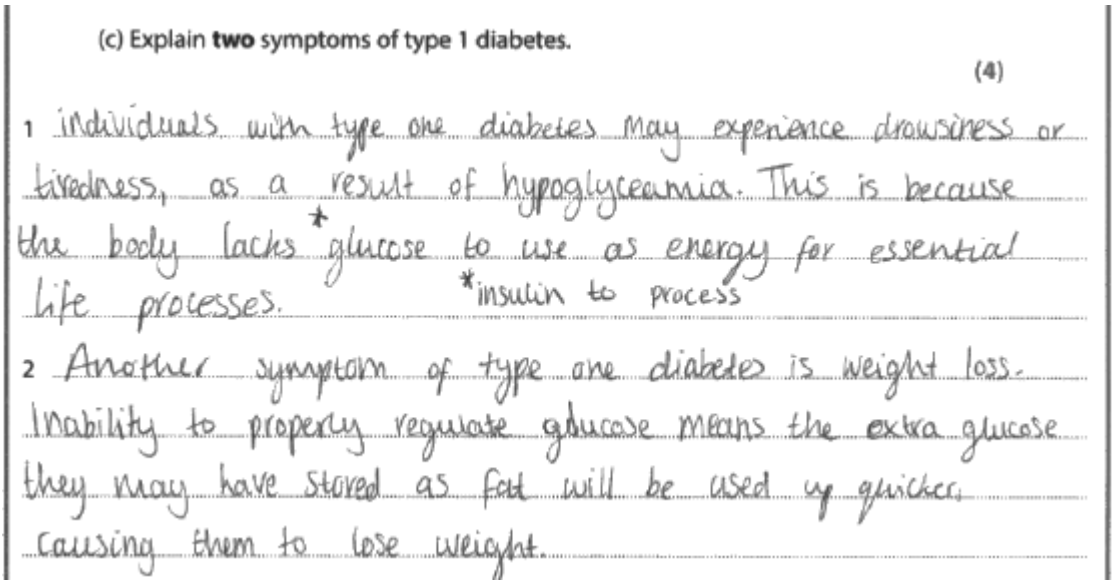
Progesterone - maintains the endometrium, keeping it suitable for ovum implantation after fertilisation when at a high-enough concentration.

Testes

Testosterone - plays a key role in facilitating the development of male secondary sexual characteristics

This question was 'explain' so an identification of two symptoms with an appropriate extension was required. This response has tiredness due to depleted energy stores and weight loss due to the fat stores being used (this was a correct response though not identified in the mark scheme, it can be awarded as another correct answer).

2(c)



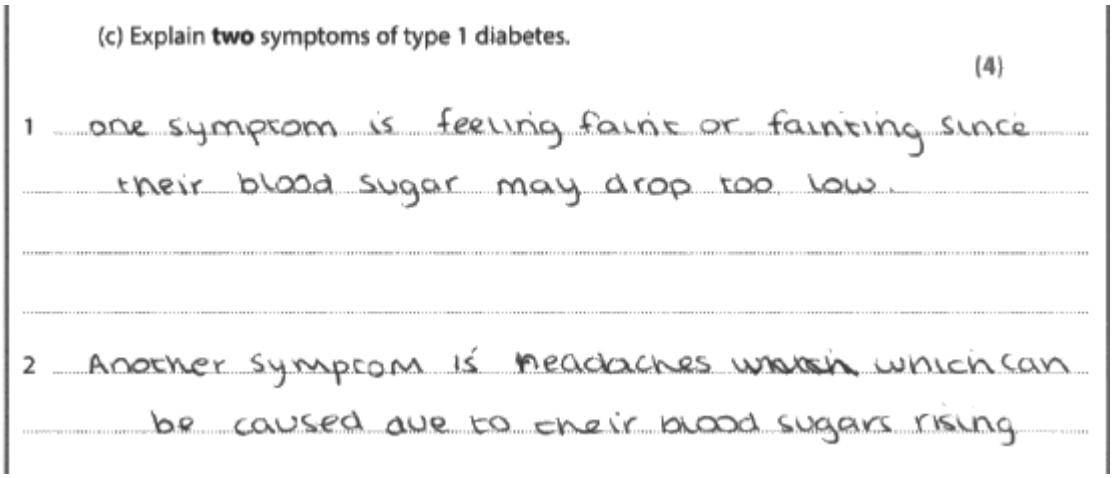
(c) Explain **two** symptoms of type 1 diabetes.

(4)

1 individuals with type one diabetes may experience drowsiness or tiredness, as a result of hypoglycaemia. This is because the body lacks * glucose to use as energy for essential life processes. *insulin to process

2 Another symptom of type one diabetes is weight loss. Inability to properly regulate glucose means the extra glucose they may have stored as fat will be used up quicker, causing them to lose weight.

The symptoms and expansions are too generic in this example, an explanation should identify what effect the high or low blood sugar is having as by itself the statement is a rewording of the question.



(c) Explain **two** symptoms of type 1 diabetes.

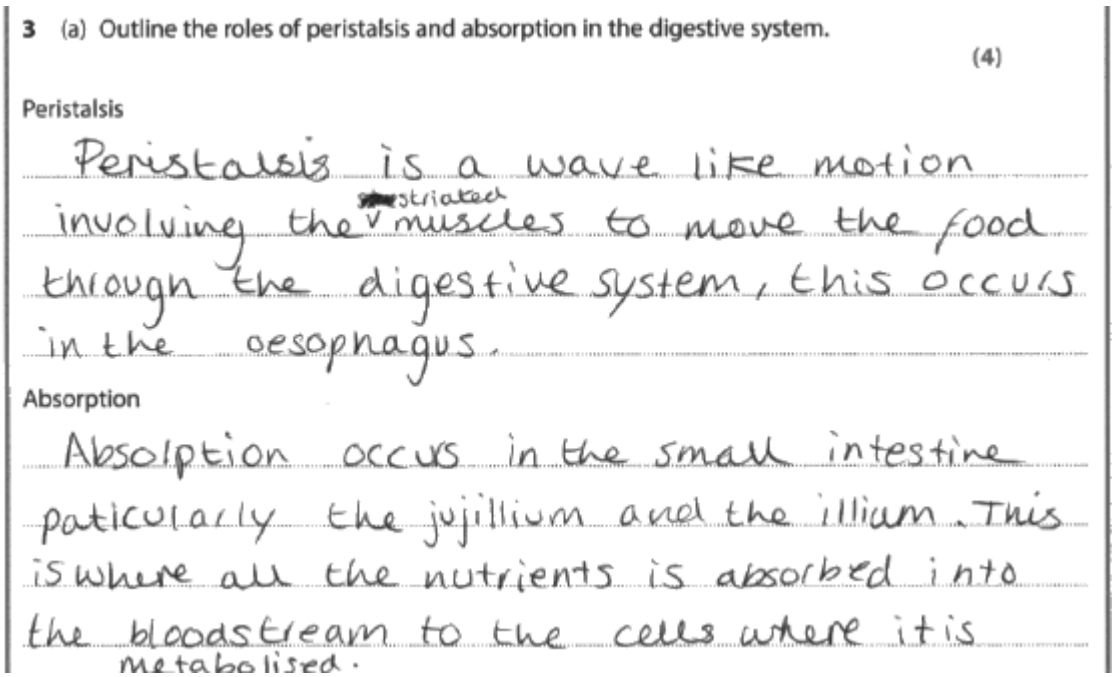
(4)

1 one symptom is feeling faint or fainting since their blood sugar may drop too low.

2 Another symptom is headaches which can be caused due to their blood sugars rising

3(a)

The command verb is outline, and this is an example of a good answer where the two identified processes have been outlined accurately. Although the learner has identified striated muscle which is incorrect as it is smooth muscle, the marks can be awarded for wave like motion and moving food through the digestive system.



3 (a) Outline the roles of peristalsis and absorption in the digestive system.

(4)

Peristalsis

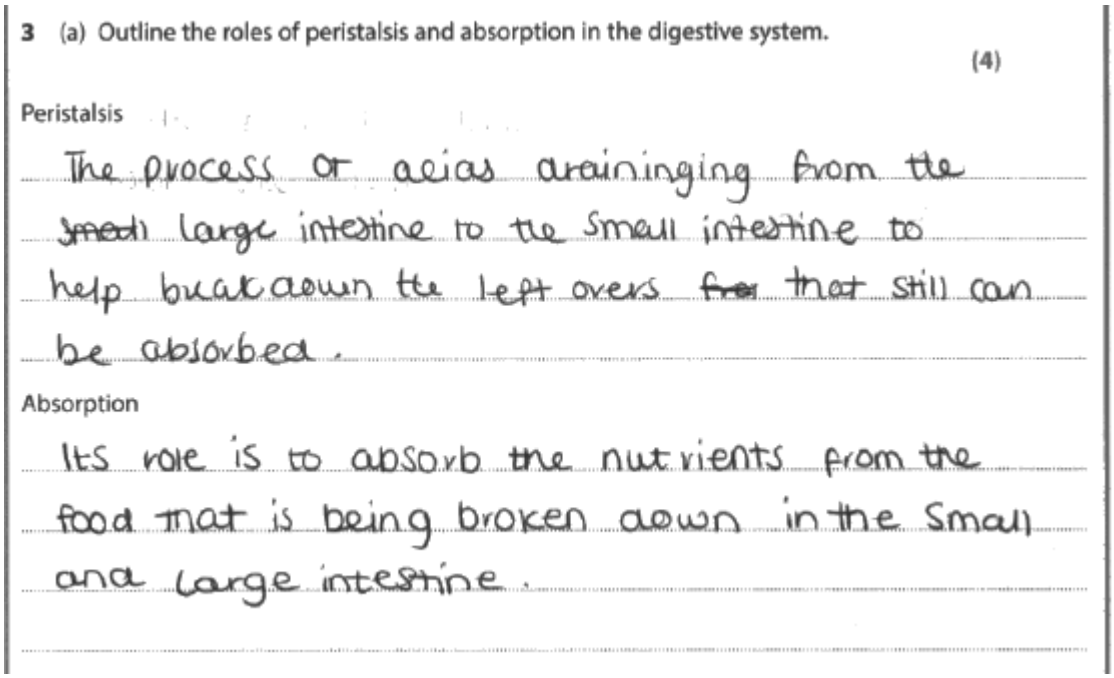
Peristalsis is a wave like motion involving the ~~smooth~~ striated muscles to move the food through the digestive system, this occurs in the oesophagus.

Absorption

Absolption occurs in the small intestine paticularly the jujillium and the illium. This is where all the nutrients is absorbed into the bloodstream to the cells where it is metabolised.

Many answers were either incorrect or so generic as to be nearly meaningless. The peristalsis answer here makes no mention of

muscular movement and the absorption answer is too generic to be credited, a specific comment about where the nutrients were absorbed to or similar was required.



3 (a) Outline the roles of peristalsis and absorption in the digestive system.

(4)

Peristalsis

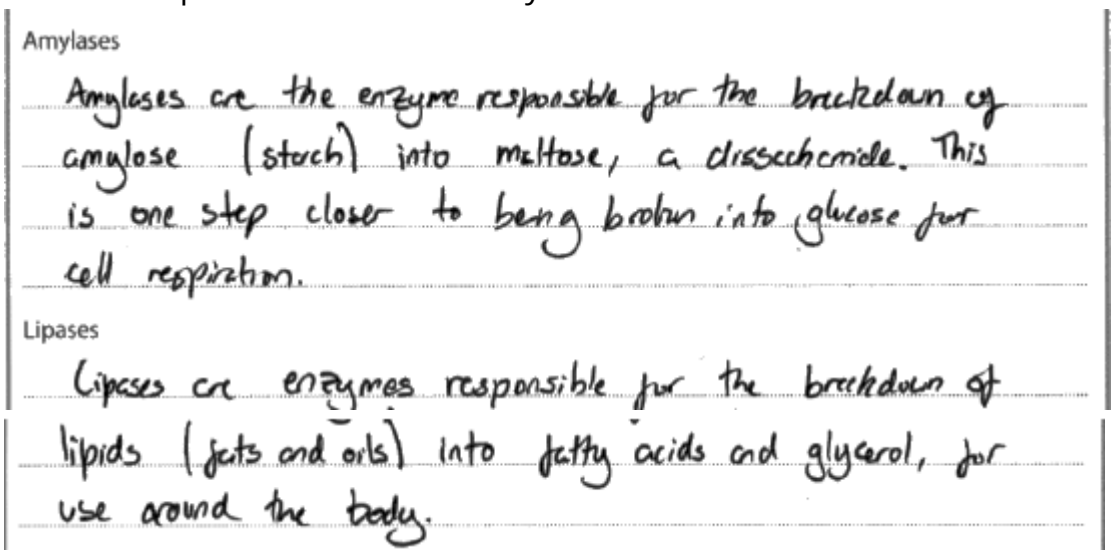
The process of aeias araininging from the ~~small~~ large intestine to the small intestine to help break down the left overs ~~for~~ that still can be absorbed.

Absorption

Its role is to absorb the nutrients from the food that is being broken down in the small and large intestine.

3(b)

Many responses gained the first mark, identifying what was being broken down but failed to expand this to say what they were broken into, this is a response that successfully does that.



Amylases

Amyloses are the enzyme responsible for the breakdown of amylose (starch) into maltose, a disaccharide. This is one step closer to being broken into glucose for cell respiration.

Lipases

Lipases are enzymes responsible for the breakdown of lipids (fats and oils) into fatty acids and glycerol, for use around the body.

In this response the answer about amylase needed to be more specific about what is being broken down and the lipase response is incorrect.

(b) Explain the role of the enzymes amylases and lipases in digestion.

(4)

Amylases

Amylases help to break down food.

Lipases

lipase & Lipases help to absorb the nutrients

3(c)

This was a higher demand explain question as there were 4 marks available for a single response. Correct responses were required to identify some uses of amino acids in the body and this answer does that well.

(c) Explain the role of amino acids in the body.

(4)

Amino acids are what Protese breaks down proteins into amino acids. Amino acids are then used to build proteins, repair cells, build new cells and to create enzymes, (a biological catalyst).

This was a common response where learners identified amino acid as an acid and assumed it was to do with digestion. They failed to appreciate that amino acids are the constituent part of proteins and therefore the role of proteins would give them a correct answer.

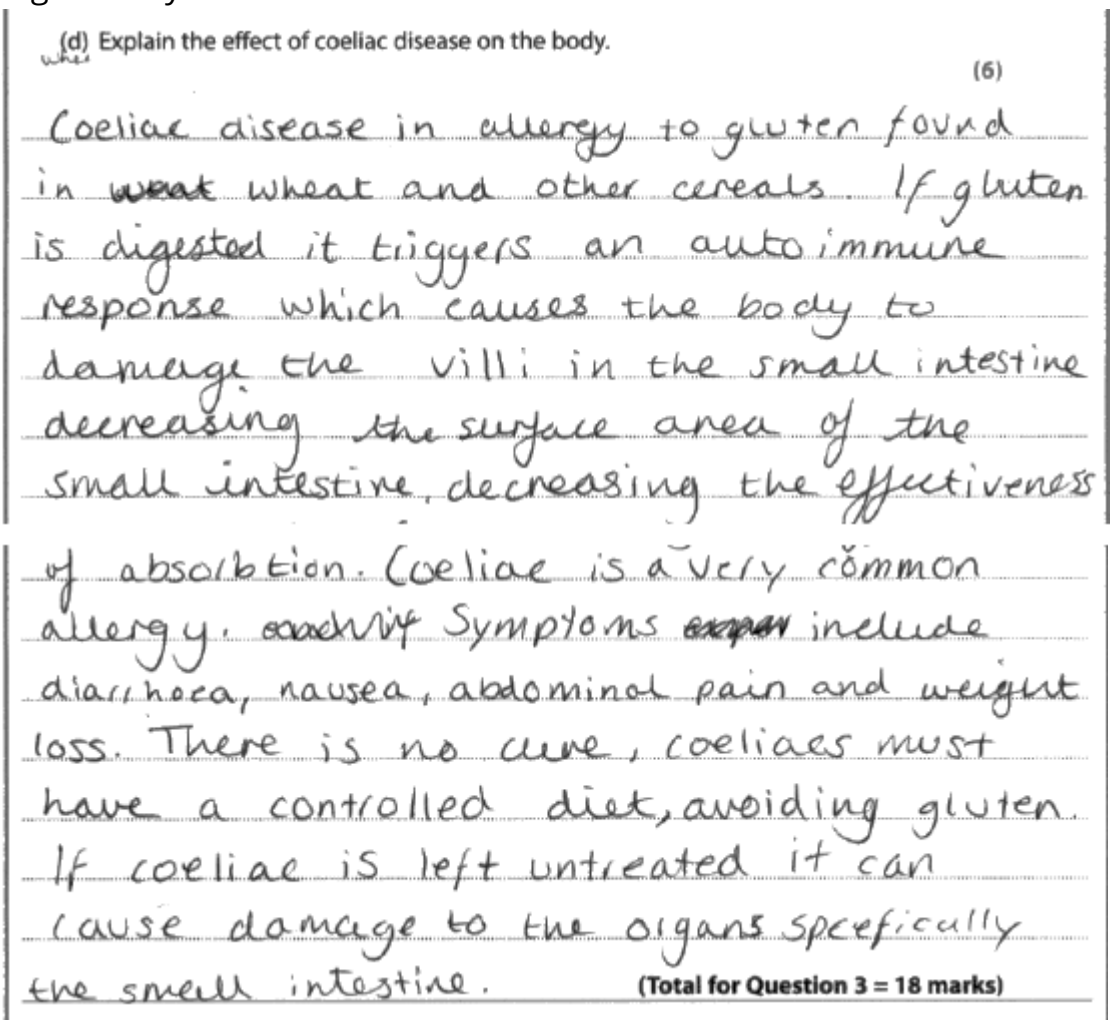
(c) Explain the role of amino acids in the body.

(4)

Amino acids help in the breakdown of e substances in the body.

3(d)

There were some nice answers seen to this question. Where learners knew about coeliac disease the biggest mistake, they made was to list the symptoms and treatments/management techniques rather than link coeliac disease to it's potential effect on the body. This is an example of a better answer linking the autoimmune response to the effect on the digestive system.



(d) Explain the effect of coeliac disease on the body.

(6)

Coeliac disease in allergy to gluten found in ~~wheat~~ wheat and other cereals. If gluten is digested it triggers an auto immune response which causes the body to damage the villi in the small intestine decreasing the surface area of the small intestine, decreasing the effectiveness of absorbtion. Coeliac is a very common allergy. ~~xxxxxx~~ Symptoms ~~xxxxx~~ include diarrhoea, nausea, abdominal pain and weight loss. There is no cure, coeliacs must have a controlled diet, avoiding gluten. If coeliac is left untreated it can cause damage to the organs specifically the small intestine.

(Total for Question 3 = 18 marks)

4(a)

The most common answers seen were red and white blood cells for this 'State' question, their were other correct versions offered as well, such as this.

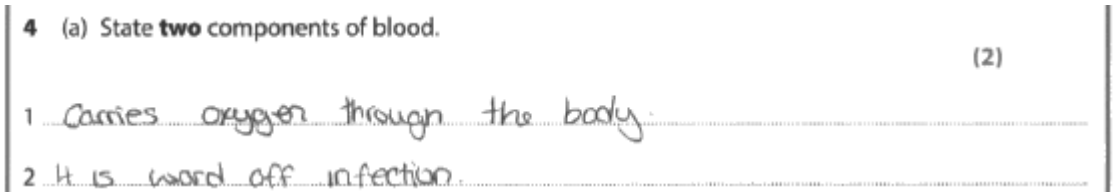

4 (a) State **two** components of blood.

(2)

1 Plasma

2 Platelets

Some learners seemed to struggled with the word component, and we got some answers like this which were about the role of the blood, and therefore incorrect.


4 (a) State **two** components of blood.

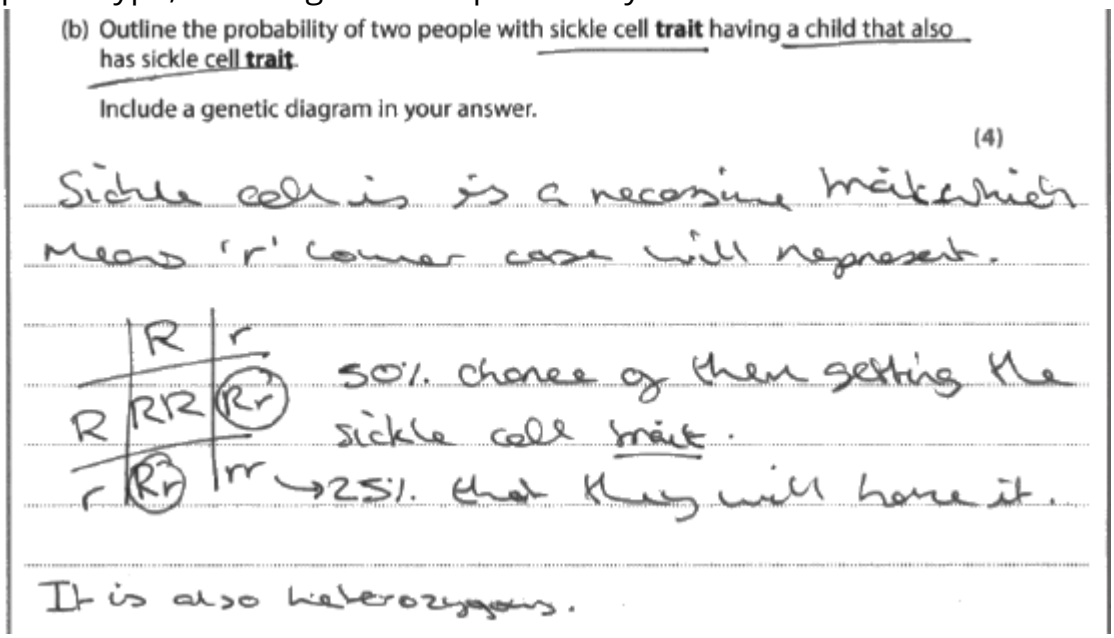
(2)

1 Carries oxygen through the body.

2 It is ward off infection.

4(b)

This response demonstrates ana understanding that the disease is recessive, and the heterozygotes demonstrate the trait as their phenotype, resulting in a 50% probability.


(b) Outline the probability of two people with sickle cell **trait** having a child that also has sickle cell **trait**.

Include a genetic diagram in your answer.

(4)

Sickle cell is is a recessive which means 'r' lower case will represent.

R r

R RR Rr

r Rr rr → 25% that they will have it.

50% chance of them getting the sickle cell trait.

It is also heterozygous.

This response has not attempted to use a genetic diagram as required in the question, not have they given a probability, just a subjective comment so there is no rewardable material.

(b) Outline the probability of two people with sickle cell **trait** having a child that also has sickle cell **trait**.

Include a genetic diagram in your answer.

(4)

The probability that their child will also have sickle cell trait is very ~~high~~ high. This is because, the trait is already in their DNA. This would have been passed down from their ~~family~~ parents so they would pass it to their child.

4(c)

This is a levelled response question so it is a best match to the descriptors in the grid in the mark scheme. This response demonstrates accurate understanding and links what is happening to some of the symptoms experienced. A level three response.

(c) Explain the symptoms of leukaemia.

(6)

Leukemia is cancer of white blood cells. Where there is an abnormal growth of white blood cells. in which also lose their ability and function to fight off bacteria and viruses in the immune system, white blood cells are made in the bone marrow, so as a result. this could cause the symptom of pain in the bone marrow, as there will be a large increase in the amount of cells. Also, as the white blood cells multiple. this reduces the amount of space for red blood cells, which contain haemoglobin to carry the oxygen. Mainly this causes symptoms such as breathlessness and fatigue, aswell as a pale complexion as the bodys cells and organs do not receive the required oxygen.

This learner has confused leukaemia with liver failure so no rewardable material. A significant minority of responses had conflated leukaemia

with other disorders so providing answers to a different question than the one that had been asked.

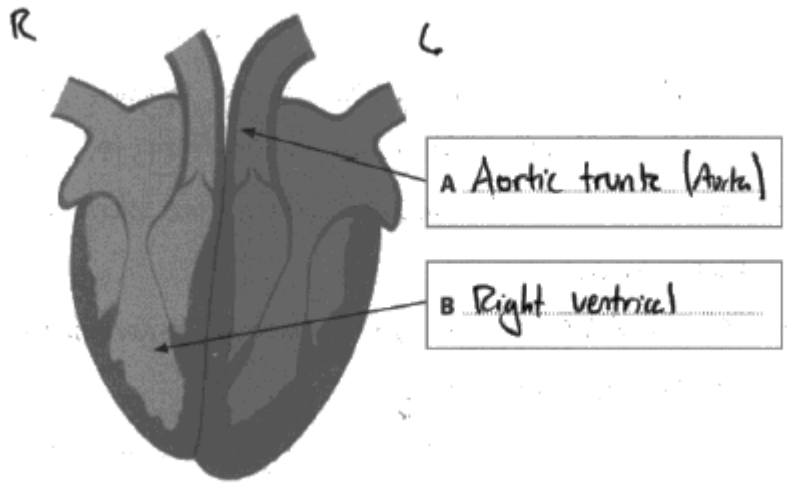
(c) Explain the symptoms of leukaemia. (6)

leukemia is a type of cancer that is commonly located in the liver. This means that the body's ability to exterminate any unwanted toxins within the body is limited. This could leave the person feeling nauseated.

5(a)

This is an accurate response, the incorrect spelling of ventricle can be ignored.

5 (a) Identify structures **A** and **B** on the diagram of the heart. (2)



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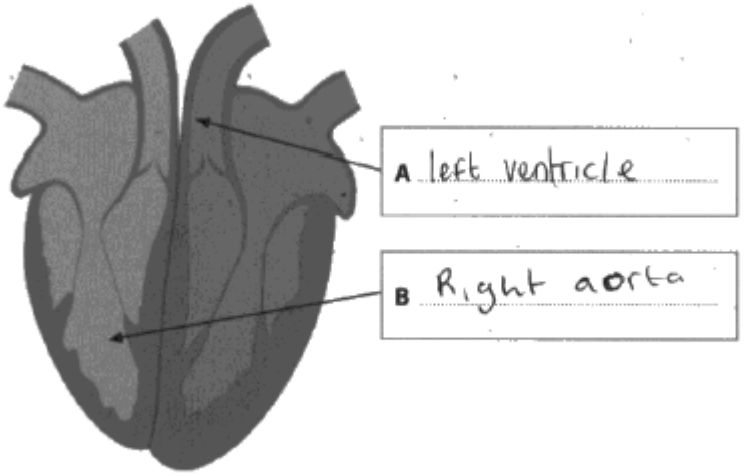
In this case the learner had the correct structures but the wrong way around, demonstrating the need for learners to double check their responses.

5 (a) Identify structures **A** and **B** on the diagram of the heart.

(2)



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5(b)

This response demonstrates a good understanding of how the heart is regulated, actually providing more points than are needed for the four marks that are on offer.

(b) Explain how the heart rate is regulated.

(4)

The heart rate is regulated by the nervous system, sending electrical impulses* telling it when to contract. The autonomic nervous system controlls automatic functions like heartbeat, and this is split further into sympathetic and parasympathetic. The sympathetic system speeds up heart rate for activities like exercise, whereas the parasympathetic system creates conditions for rest, and so slow heart rate down.
* to the cardiac muscle.

This responses demonstrates a basic understanding of the brain controlling the heart rate through nervous signals, however the detail is not enough to gain marks at this level.

(b) Explain how the heart rate is regulated.

(4)

The brain sends electrical impulses through the nervous system to the heart which tells it to beat ~~the~~ using its non-striated cardiac muscles which pumps blood around the body

5(c)

Some learners struggled to remember which blood vessel is which, but this response demonstrates good knowledge although it is listing rather than description, especially for the response about capillaries.

(c) Describe the structures of capillaries and veins.

(4)

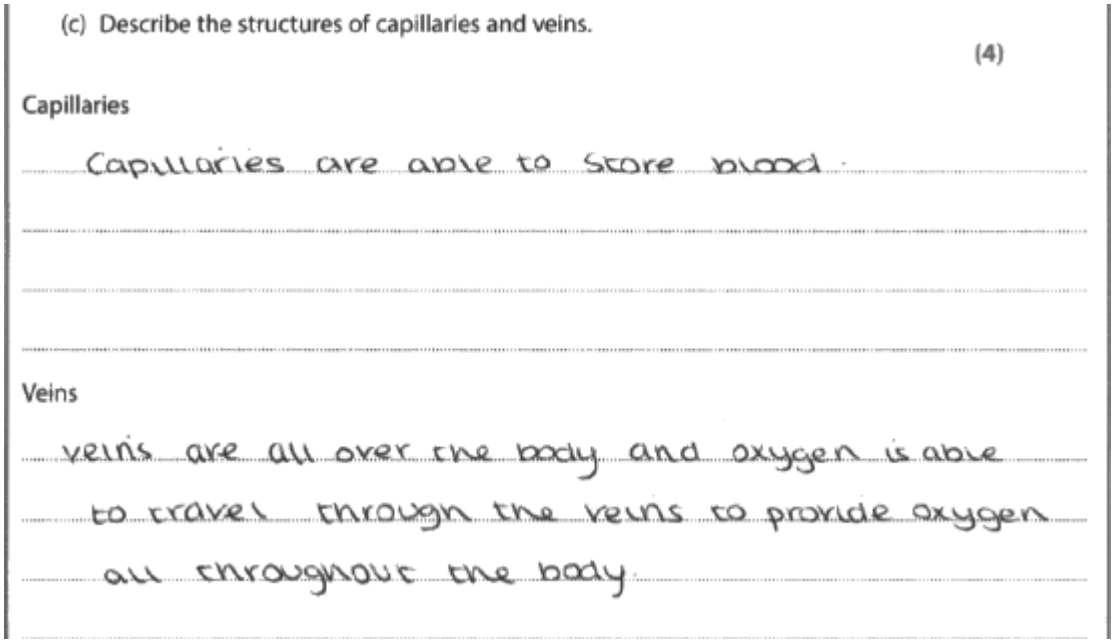
Capillaries

Very thin. Single-cell wall. Connects arteries to veins. Allows diffusion to occur.

Veins

Wide lumen. ~~Has a valve~~ Contains valves to prevent back flow. Usually carries deoxygenated blood to the heart.

This response demonstrates some misconceptions about the function of blood vessels and no marks have been awarded.



(c) Describe the structures of capillaries and veins.

(4)

Capillaries

Capillaries are able to store blood.

Veins

veins are all over the body and oxygen is able to travel through the veins to provide oxygen all throughout the body.

5(d)

Some good descriptions of coronary heart disease were seen but this were often in a list format and learners often struggled to link them to body systems. This response demonstrates accurate knowledge, with links to body systems and sustained reasoning, a level three answer.

(d) Explain the effects of coronary heart disease on body systems. (8)

- atheroma
- Clotting - stroke
- energy levels

CHD is when the coronary arteries in the body become lined with a plaque called atheroma. The atheroma builds up, narrowing the arteries until oxygen-rich blood can no longer effectively pass through. This means the body's cells are no longer recieving enough oxygen, and the glucose in the bloodstream is also blocked. Cells will therefore not have enough energy to perform their functions, and all systems will slow down. This also means deoxygenated blood will flow slower, and take longer to be reoxygenated.* Additionally, in the cardiovascular system, strokes may occur. If any of the atheroma breaks off, it may cause a clot, which will prevent blood flowing properly, perhaps inhibiting the brain's supply. which can be fatal

*slowing down the respiratory system.

In this response there is an attempt to link to body systems, but it is not done accurately, and little understanding is shown. There is some isolated elements of knowledge, a level one response.

(d) Explain the effects of coronary heart disease on body systems.

(8)

Coronary heart disease may affect the respiratory system because the body may not be taking in enough oxygen furthermore, ~~vane~~ the ~~body~~ heart may not be providing enough oxygen for the body which can also affect the respiratory system. Coronary heart disease may cause certain systems in the body to stop working properly. The endocrine system can also be affected because not enough oxygen is getting to the body.

6(a)

An accurate comparison looking at figures for both men and women quoting relevant ones accurately, a good answer.

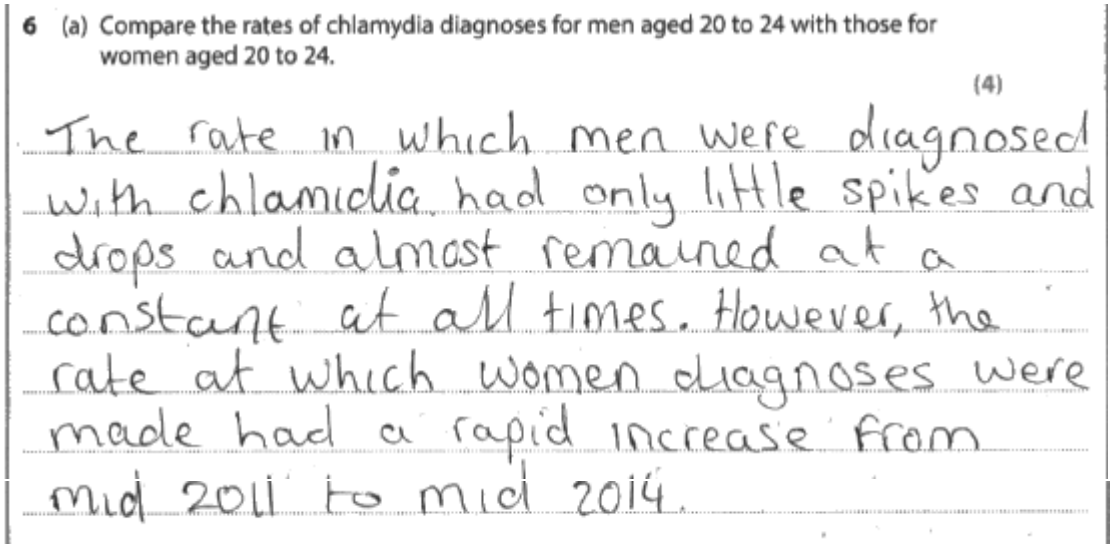
6 (a) Compare the rates of chlamydia diagnoses for men aged 20 to 24 with those for women aged 20 to 24.

• Both rising
• women significantly higher

(4)

Whilst both rates have seen a rise in recent years, this is mostly where the similarity ends. Men's rates have remained consistently averaging around 1750 for the last few years, whereas women's rates have been over 2500, peaking at ~~2750~~ 2750 since then. In fact, chlamydia diagnoses for men aged 20-24 at its peak (1950) has never reached the lowest rate in women of the same age range (2150). Women's rates of diagnosis are significantly higher than men's.

Descriptive points are made in this response, they are quite generic and the structure of the answer is poor.



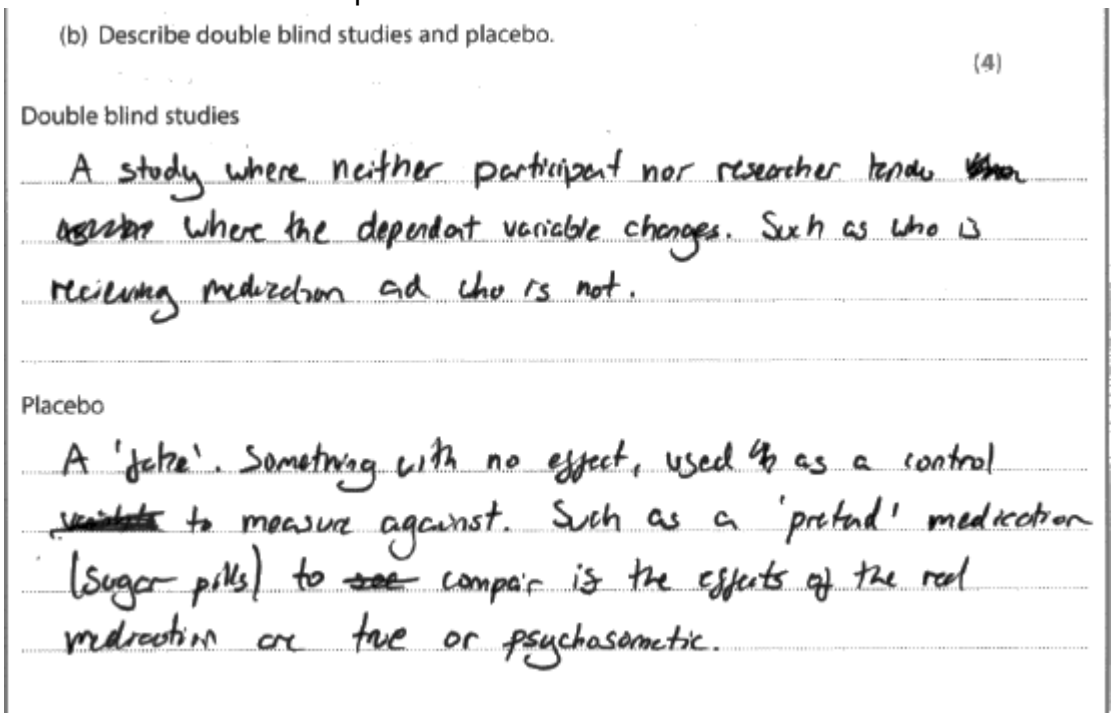
6 (a) Compare the rates of chlamydia diagnoses for men aged 20 to 24 with those for women aged 20 to 24.

(4)

The rate in which men were diagnosed with chlamidia had only little spikes and drops and almost remained at a constant at all times. However, the rate at which women diagnoses were made had a rapid increase from mid 2011 to mid 2014.

6(b)

This answer was either answered well, as in this example here, or learners obviously had no knowledge of this area of the specification and came up with some very creative answers that generally gave no marks as in the second example.



(b) Describe double blind studies and placebo.

(4)

Double blind studies

A study where neither participant nor researcher know ~~the~~ where the dependant variable changes. Such as who is recieving medication and who is not.

Placebo

A 'fake'. Something with no effect, used as a control ~~variable~~ to measure against. Such as a 'pretend' medication (sugar pills) to ~~see~~ compair is the effects of the real medication are true or psychosomatic.

As well as the creative answers, a significant minority of learners confused placebo with placenta in this response, not realising that in the context of the question it could not possibly be correct.

Double blind studies

You don't know what's gonna happen. Happ-ens twice.

Placebo

Comes out once a baby is born. It surrounds them in the womb, so acts like an extra layer of protection for them.

6(c)

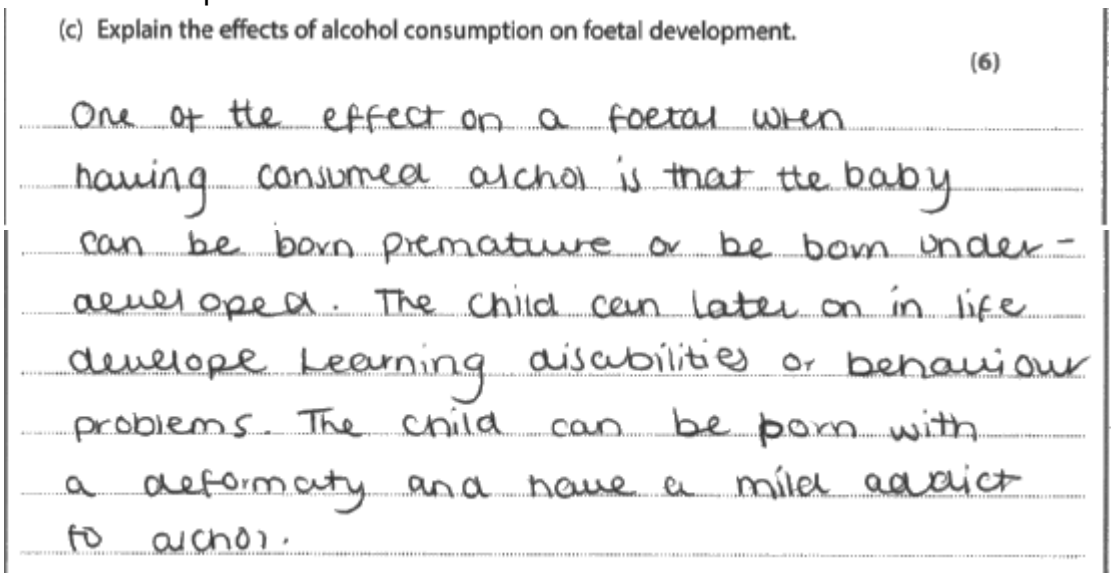
There were a lot of level two answers seen for this question, where learners had listed a lot of symptoms of foetal alcohol syndrome. Fewer responses, this is an example, made the link to the reduced blood flow, and the toxicity of alcohol to the baby directly.

(c) Explain the effects of alcohol consumption on foetal development.

(6)

alcohol slows down a mother's heart rate, meaning less blood containing oxygen flows to the womb, depriving the foetus of nutrients and oxygen. Additionally, drinking whilst pregnant can cause Foetal Alcohol Syndrome, preventing a foetus' brain from fully or normally developing in-utero. It also affects the outward appearance of the baby. The face is flatter, and they can be born with a cleft palette, because alcohol prevented them from getting the chemical energy required to develop. Alcohol consumption has the biggest impact during the first and second trimesters, when the foetus' vital and sensory organs are developing. Alcohol consumption is a teterogen, meaning it causes birth defects.

Responses like this, where a list of effects was given, including the later effects on the child rather than the effects on the foetus demonstrate a level one response.



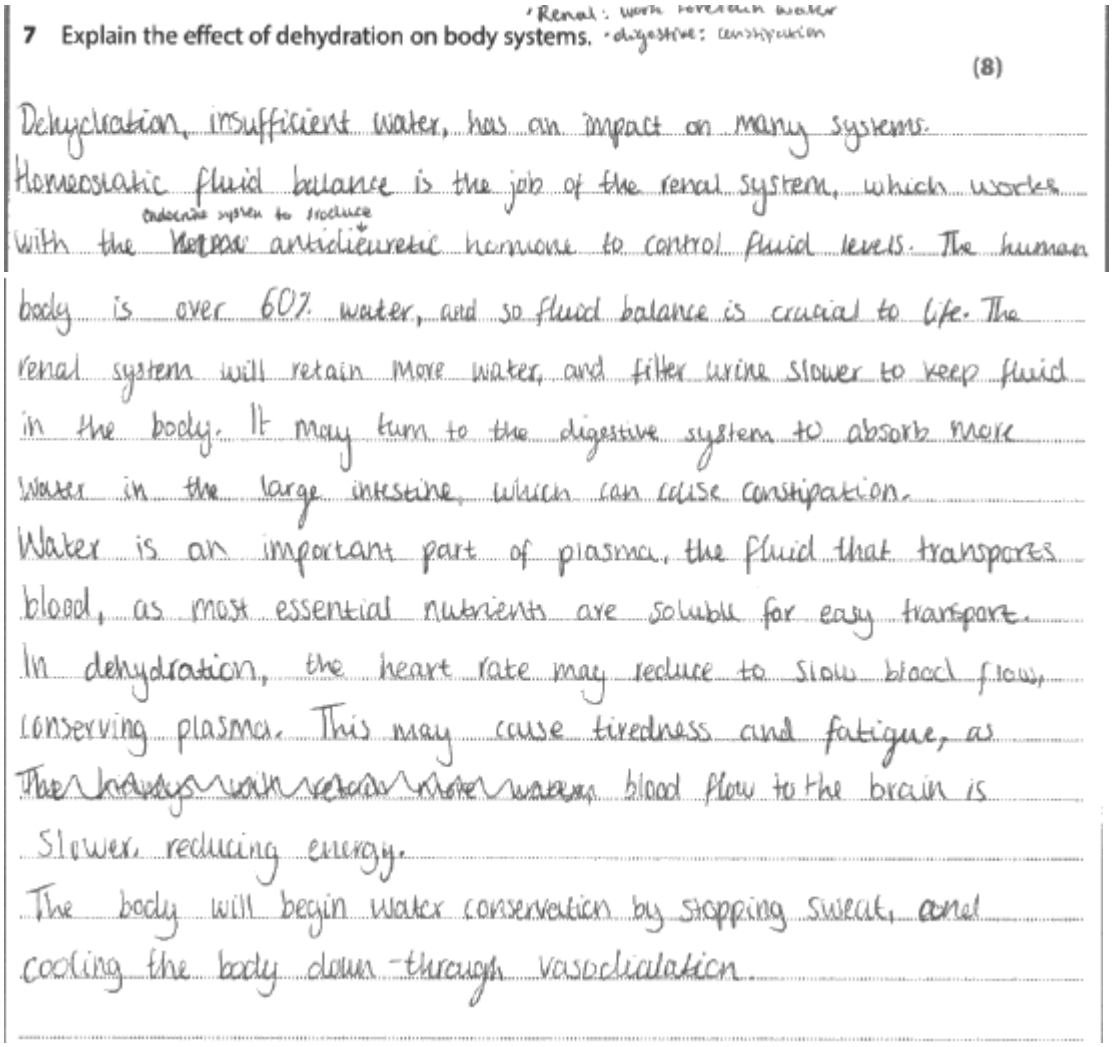
(c) Explain the effects of alcohol consumption on foetal development.

(6)

One of the effect on a foetal when having consumed alchol is that the baby can be born premature or be born under-developed. The child cean later on in life develope Learning disabilities or behaviour problems. The child can be born with a deformaty and have a mild addict to alchol.

7

This question was a levelled response question, some good responses were seen where the learner has accurately linked the effect to dehydration to different body systems and the points made are relevant to the question. This answer demonstrates a level three response.



7 Explain the effect of dehydration on body systems. (8)

Dehydration, insufficient water, has an impact on many systems.
Homeostatic fluid balance is the job of the renal system, which works with the endocrine system to produce antidiuretic hormone to control fluid levels. The human body is over 60% water, and so fluid balance is crucial to life. The renal system will retain more water, and filter urine slower to keep fluid in the body. It may turn to the digestive system to absorb more water in the large intestine, which can cause constipation.
Water is an important part of plasma, the fluid that transports blood, as most essential nutrients are soluble for easy transport.
In dehydration, the heart rate may reduce to slow blood flow, conserving plasma. This may cause tiredness and fatigue, as the kidneys retain more water, blood flow to the brain is slower, reducing energy.
The body will begin water conservation by stopping sweat, and cooling the body down through vasoconstriction.

This response demonstrates some isolated elements of knowledge, but they are very generic and not linked to body systems. Where there is an attempt to link to the respiratory system the comment is inaccurate. A level one response.

7 Explain the effect of dehydration on body systems.

(8)

Dehydration can cause body systems to shut down because the body is not able to function properly without water so cells the body can start to stop working. People can go upto 3 days without drinking anything before all of their ~~body~~ system body systems ~~are~~ and organs start failing. The respiratory system may stop working due to the fact that no water is being taken in which means not a lot of oxygen will be produced by the body. The nervous system may also be affected because as the body starts to shut down, the nerves may stop recieving nerve impulses from the brain.

Summary

- Many of the issues that caused problems for learners were caused by the fragmented nature of the build up to the exam caused by factors out of all our control. Hopefully this will not be such an issue going forward. Given the problems caused by the pandemic there are few lessons from the paper that are applicable to a normal series. The only ones I would suggest would be useful for learners to consider are below.
- Learners should, when answering the questions, take careful note of the verb used and the number of marks on offer. They should, so far as possible, try to match what they write to those requirements. Answers that included six or seven rewardable points were seen for four-mark questions; this is a waste of time that could be used on other questions.
- There were some occasions when errors were seen that meant no marks were awarded even though it was obvious the learner understood the concepts being examined. Learners should go back over their answers and make sure what they have written matches what they intended.