BTEC Level 3 National in Health and Social Care

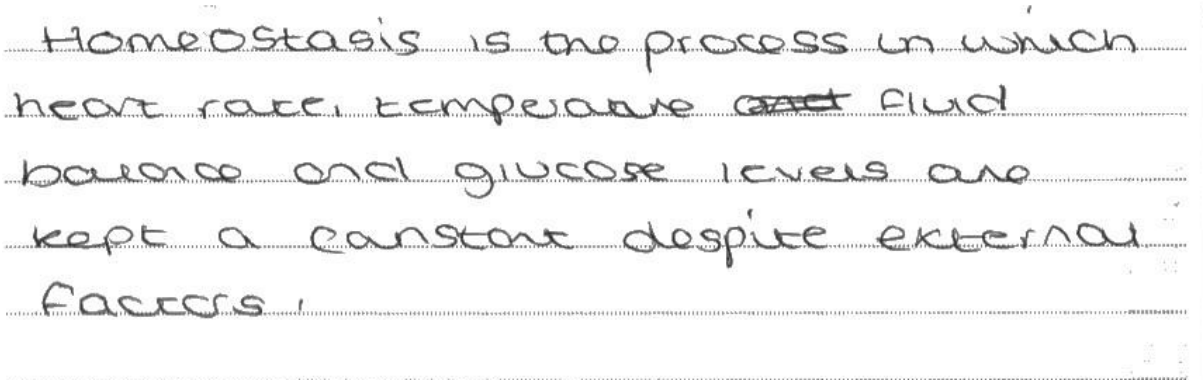
Sample Marked Learner Work

External Assessment- January 2018

Unit 3: Anatomy and Physiology for Health and Social Care.

1 (a) (i) Outline the role of homeostasis in the body.

Higher scoring response

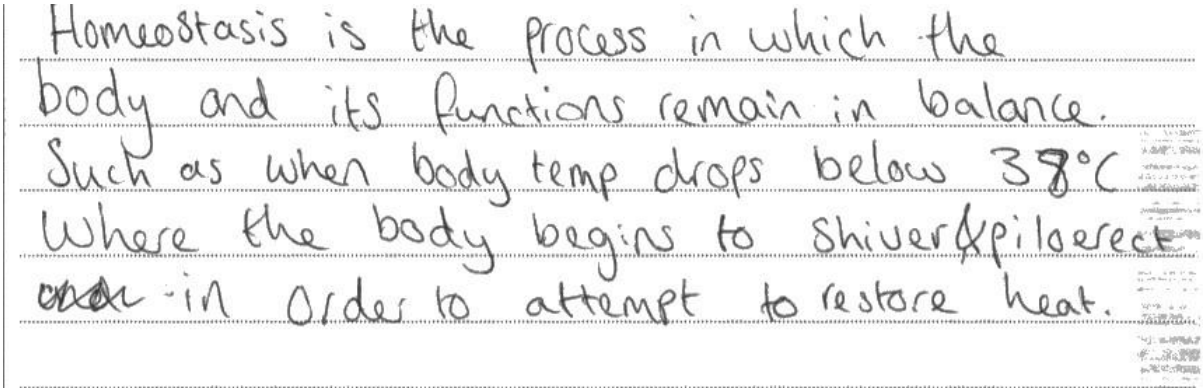


Specification reference B1.1

Marks are awarded for maintenance of an internal equilibrium and two identified factors that are kept constant.

The learner included more information than was needed to gain full marks, temperature, glucose and fluid balance. (2)

Lower scoring response



The learner has identified equilibrium, and one example, temperature so has not gained full marks.

(b) Explain the role of the kidney in osmoregulation.

Higher scoring response

The kidneys balance the amount of water in the body so that dehydration doesn't occur, or so that there isn't too much water in the body.

Specification reference B1.7

Rewardable material includes maintenance of fluid balance to prevent dehydration.

Lower scoring response

The kidney takes in the good things that the body needs and lets the bad pass through so it can be emptyed out your body.

The learner has basically described the kidney's role in removing toxins, not osmoregulation. No rewardable material.

(c) State the role of the ureter.

Higher scoring response

The ureter connects the kidney's to the bladder in order to store urine.

Specification reference B10.2

The role is correctly identified.

Lower scoring response

It releases urine.

The learner has recognised that the ureter is part of the renal system but has not identified the role correctly.

2 (a) Enzymes are proteins that catalyse reactions in the body.

Describe the roles of amylases and proteases in digestion.

Higher scoring response

Amylases, these are found in Saliva, they are responsible for the breaking down of carbohydrates. creating glucose.

Proteases these are found in the ~~stomach~~ small intestine which are responsible for the breaking down of amino acids/ proteins.

Specification reference B6.4

The learner has accurately described the role of amylases and proteases in digestion, with accurate expansions so covering all the available points.

Lower scoring response

Amylases is found in mouth with the salivary gland. It is a neutral pH. It helps to break down the food and make it a liquid ~~to~~ so that it can pass through the oesophagus. Helps with mastecation and mechanical digestion.

Proteases Protein is turned into amino acid by protease. ~~It also~~ ~~This enzyme~~ The protease is the enzyme and the protein is the substrate. They both fit together.

The learner has recognised that proteins are broken down to amino acids.

The statement about amylases is too generic.

(b) Describe the cause and effects of coeliac disease.

Higher scoring response

Coeliac disease is an autoimmune disease that is said to be genetic, but hasn't actually been proven. This is where the body's digestive system has an intolerence to gluten. Such as not being able to eat wheat products and cereals. The villi in the small intestine is known to decrease or is ~~sm~~ has a smaller surface area to someone with the disease. Effects may be diarrhea, stomach pains and nausea and headaches

Specification reference B6.8
The learner has demonstrated accurate knowledge and understanding, knowing it is an autoimmune disease caused by a reaction to gluten, and they have described symptoms accurately. They could have gone on to describe the effect the immune system has on the lining of the intestine in more detail to improve the answer. A level 3 answer.

Lower scoring response

People with coeliac disease can't digest dairy products properly. This is because there body doesn't have the right equipment needed in breaking it down. People with coeliac disease will need to find alternative ways to consume daing as without it bones can become weaker and ~~at~~ it's packed full of healthy and important fats.

The learner has recognised that coeliac disease is a disorder of the digestive system. However, they have confused it with dairy intolerance. Unfortunately this means there is no rewardable material.

3 (a) Explain the role of the spleen in the immune response.

Higher scoring response

Spleen is important in the immune response because it allows lymphocytes to kill and destroy the invading pathogen. The spleen is the messenger to the lymphocytes to tell them to take the invading pathogen into the vessels produce antibodies that are produced from the white blood cells to destroy it. The vessels then let go of the abnormal cell

Specification reference B9.3

The learner has referred to white blood cell production, that then produce antibodies.

Lower scoring response

The spleen is responsible for storing red blood cells to help get nutrients and proteins around the body.

Although the spleen has a role in recycling red blood cells, this is not part of the immune response, so no rewardable material.

(b) T cells and B cells are both white blood cells.

Compare the roles of T cells and B cells in the immune response.

Higher scoring response

T cells and B cells are present within the lymphatic system used as a response to kill bacteria that produce Toxins and invade our immune System. T cells are the first cells which carry out the response of an invading bacteria and engulf the micro-organism. The B cells will remember the antibody on the foreign substance and attack the foreign cell if it came into contact with the body.

Specification reference B9.4

The learner has recognised that they are both involved in combating pathogens, that T cells have a role in phagocytosis and B cells are involved in antibody production.

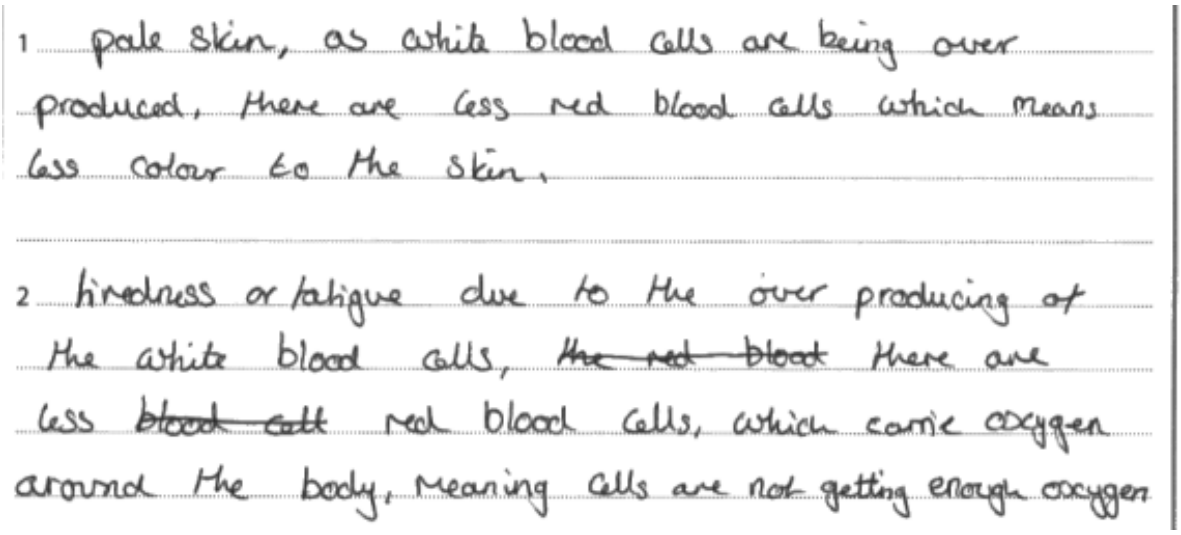
Lower scoring response

T cells travel through the veins that go all the way around the body to keep the cardiac cycle going Also B cells are the ones that store all the oxygen and releases it to the T cells.

The learner has recognised that they are both cells in the blood, but the information presented is inaccurate, no rewardable material.

(c) Explain **two** symptoms of leukaemia.

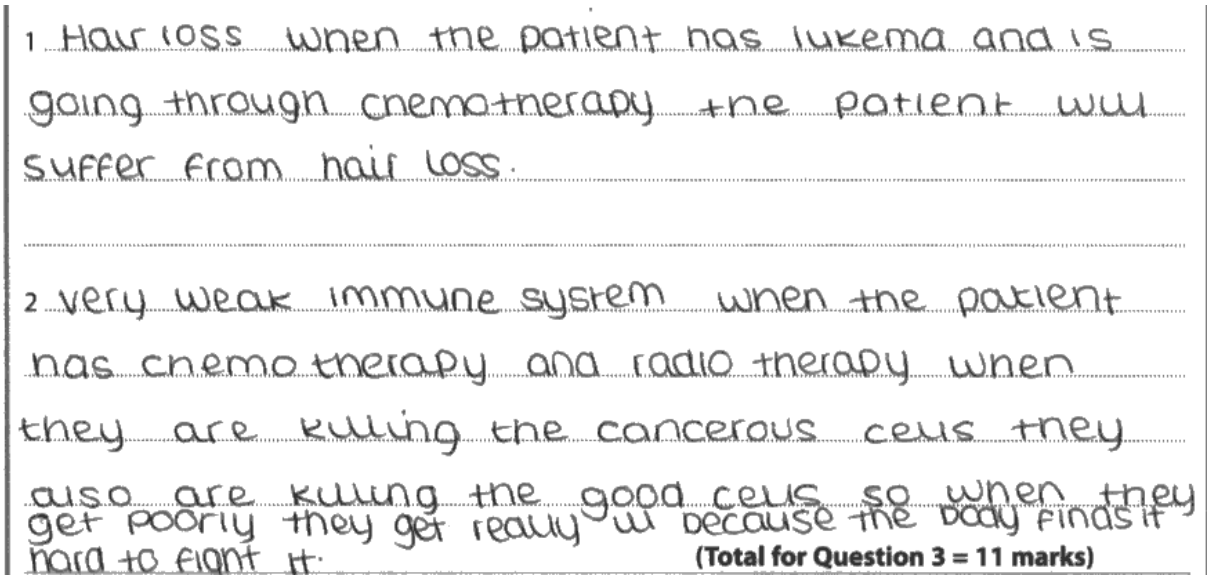
Higher scoring response



Specification reference B9.6

The rewardable material includes a pale skin due to a reduction in red blood cells and tiredness due to the reduction in available oxygen (anaemic)

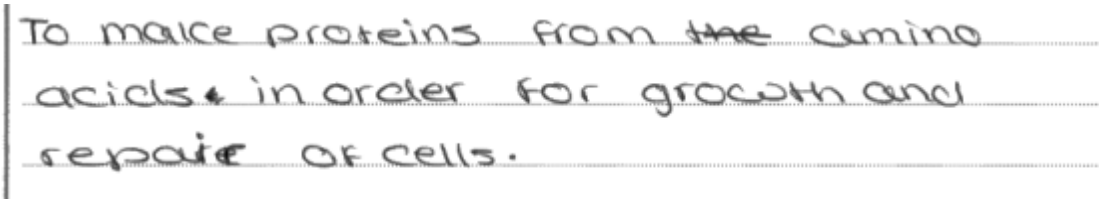
Lower scoring response



The learner has described the effect of cancer treatments accurately, unfortunately that was not what is required by this question, so no rewardable material.

4 (a) (i) Outline the function of ribosomes.

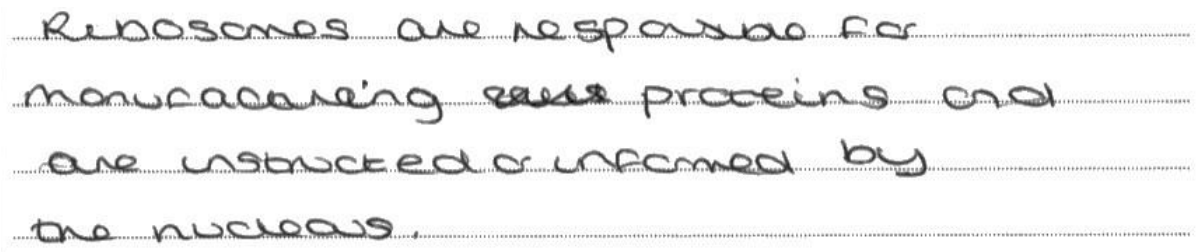
Higher scoring response



Specification reference A1.1

Rewardable material includes protein synthesis from amino acids. The learner has then gone on to include a reason for protein production, which was not required by this question.

Lower scoring response



The learner has identified that ribosomes make proteins but has not expanded this to gain the second mark available.

(b) (i) Explain how neurons are adapted to pass impulses effectively.

Higher scoring response

Nuerons are adapted because of the fact that they have the propatics of excitability and conductability. Excitability means that they are able to respond to a stimulus and transmit nerve impulses. Conductability means that they are able to transmit nerve impulses to other nuerones, muscles and glands. Neurons have a cell body, axon, myelin sheath, schawn cell, dendrite and this all enables them pass nerve impulses effectively. The dendrite recives the nerve impulse and sends it across the axon and at a synapse the next nuerone recieves the impulse. The neuron recieves a messages and in response to this it responds to the stimulus by transmitting a nerve impulse. As well as this they are not attached but they are all in a group so that they can all work effectively. They are part of the which is the peripheral nervous system. PNS

Specification reference A2.4

The learner has demonstrated accurate knowledge and understanding.

They have referred to the passage of impulses and the detailed structure of a neurone.

A level 3 answer, it could have been improved by closer reference to how the structures linked to the effective passage of impulses.

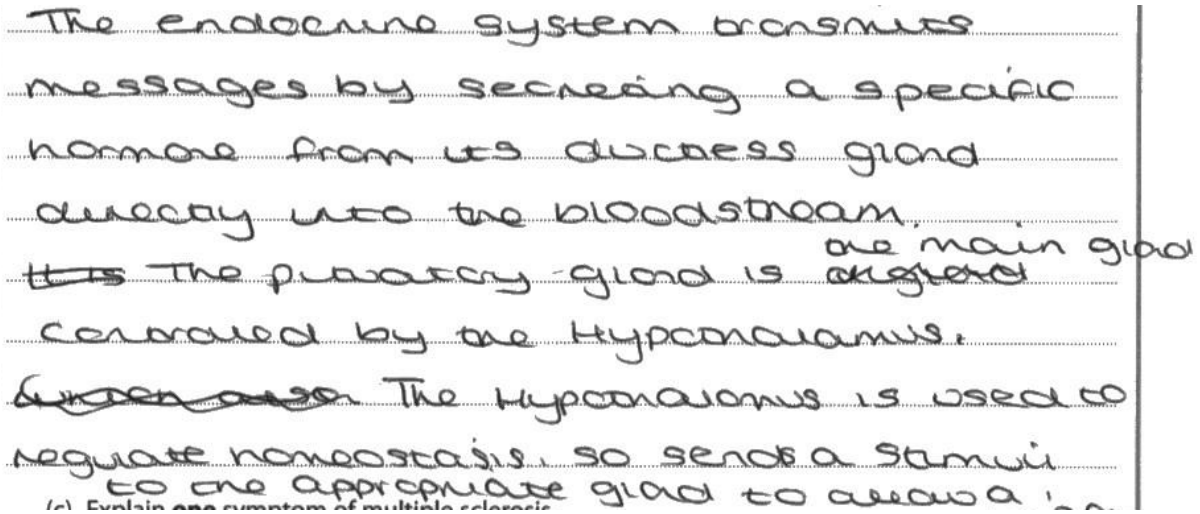
Lower scoring response

Neurons are adapted to pass impulses effectively through the nervous system all around the body sending the right information through impulses to the brain which then correcets or adapts the impulse to be passed on.

The learner has referred to the role of neurones, however they have not explained how they are adapted so no rewardable material.

(ii) Explain how the endocrine system transmits messages.

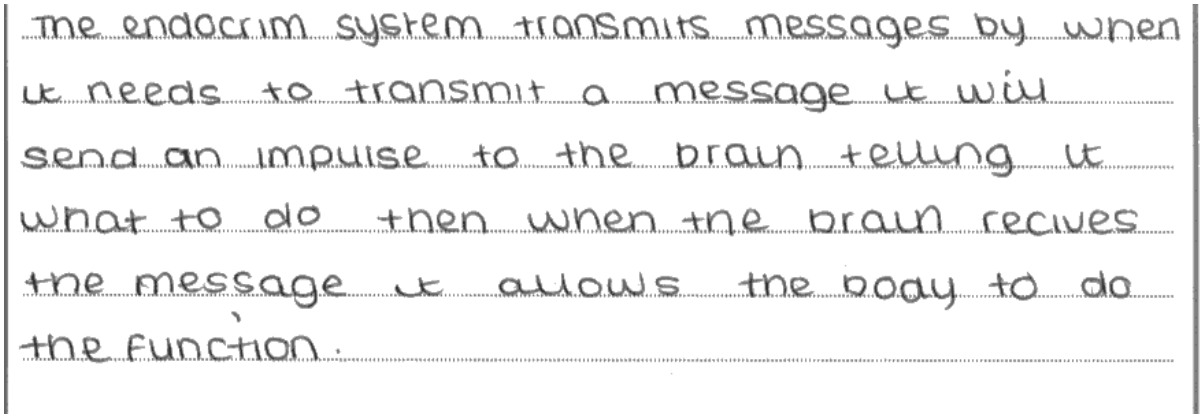
Higher scoring response


The endocrine system transmits messages by secreting a specific hormone from its ductless gland directly into the bloodstream. The pituitary gland is the main gland controlled by the Hypothalamus. The Hypothalamus is used to regulate homeostasis, so sends a stimuli to the appropriate gland to allow a

Specification reference B8

The learner has explained that the endocrine system consists of ductless glands (empties straight into the bloodstream), and the hormones travel around the body in the blood. They have failed continue their explanation to cover how the hormones 'deliver' their message when they reach the appropriate target organ.

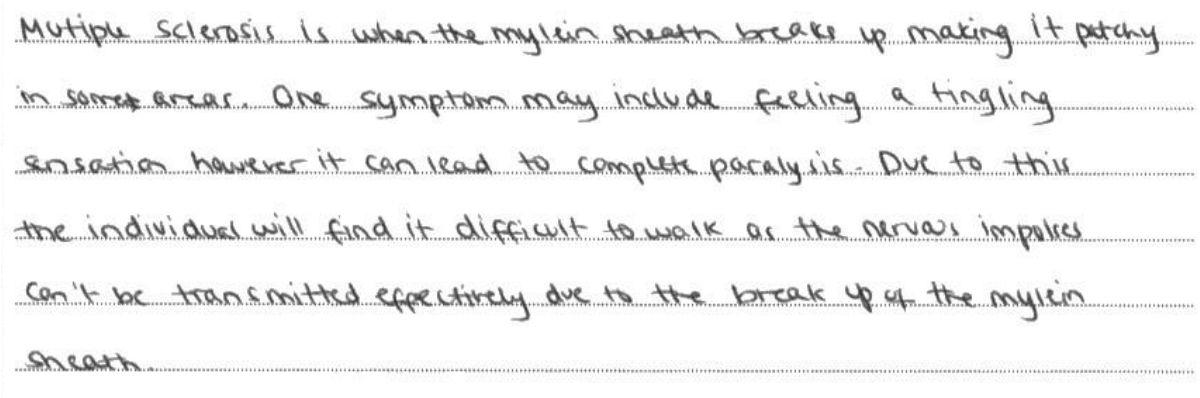
Lower scoring response


The endocrim system transmits messages by when it needs to transmit a message it will send an impulse to the brain telling it what to do then when the brain recives the message it allows the body to do the function.

This learner has confused the endocrine system with the nervous system, not appreciating that both systems deliver messages in different ways. No rewardable material.

(c) Explain **one** symptom of multiple sclerosis.

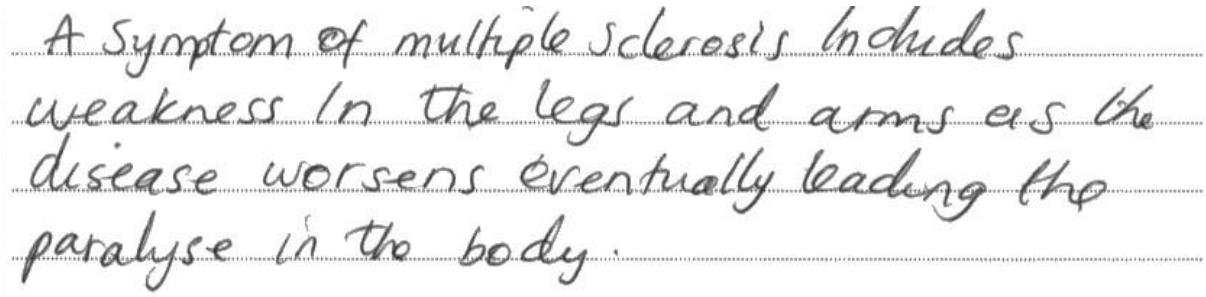
Higher scoring response


Mutiple sclerosis is when the mylein sheath breaks up making it patchy in some areas. One symptom may include feeling a tingling sensation however it can lead to complete paralysis. Due to this the individual will find it difficult to walk as the nerves impulses can't be transmitted effectively due to the break up of the mylein sheath.

Specification reference B7.4

The learner has explained that the condition is caused by the damage to the myelin sheath, which can no longer pass messages effectively. They have gone on to explain the effect on mobility. The tingling sensation is a separate symptom so not rewardable.

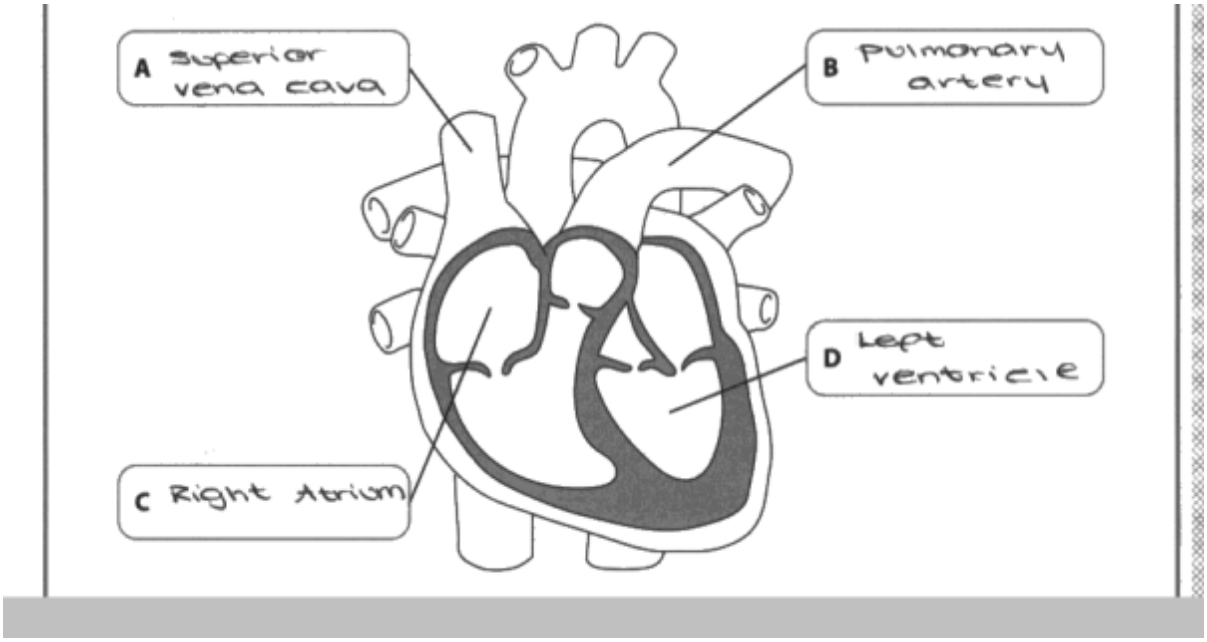
Lower scoring response


A Symptom of multiple sclerosis includes weakness in the legs and arms as the disease worsens eventually leading the paralyse in the body.

The learner has identified a mobility issue but not gone on to explain it.

5 (a) (i) Identify the **two** chambers and the **two** blood vessels on the diagram of the heart below.

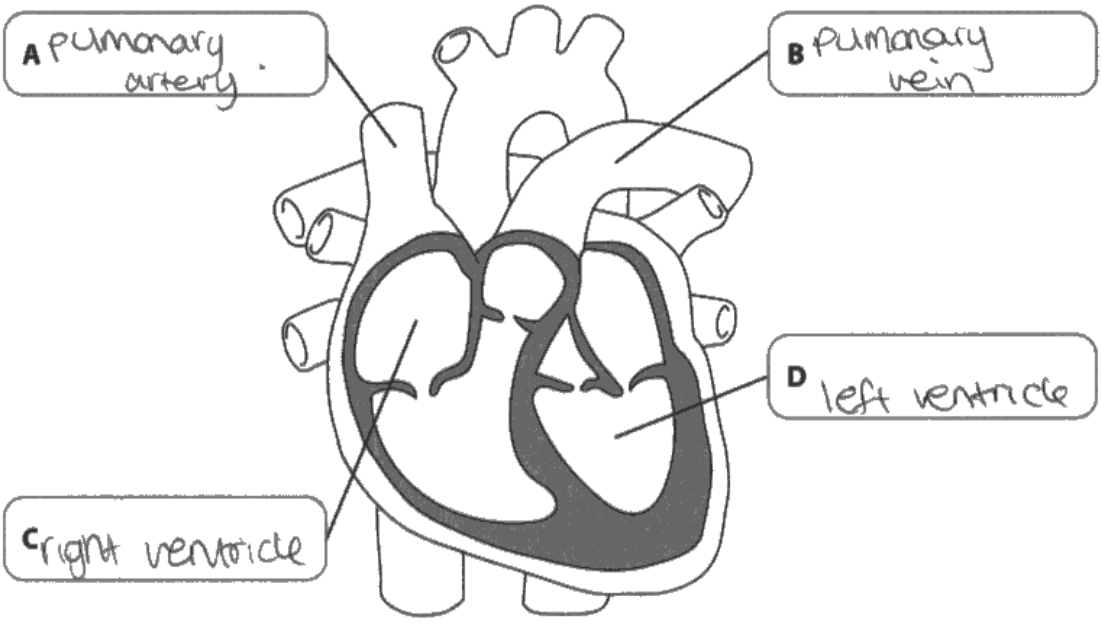
Higher scoring response



Specification reference B2.1

The learner has correctly identified the structures of the heart.

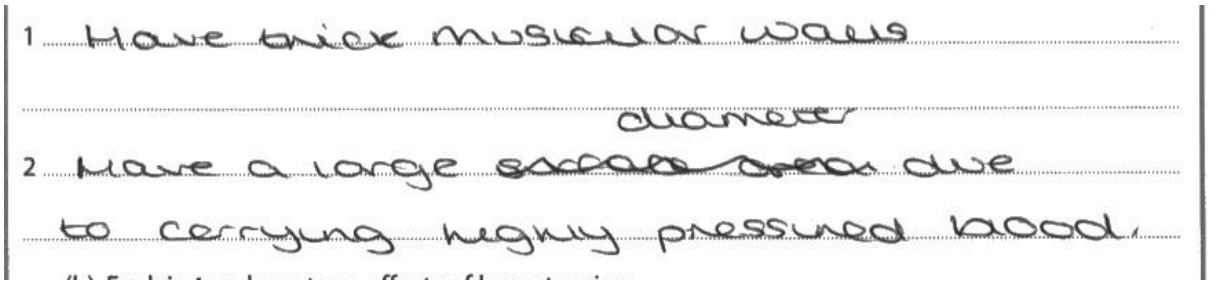
Lower scoring response



The left ventricle is identified correctly, the other structures are identified incorrectly.

(ii) State **two** features specific to arteries.

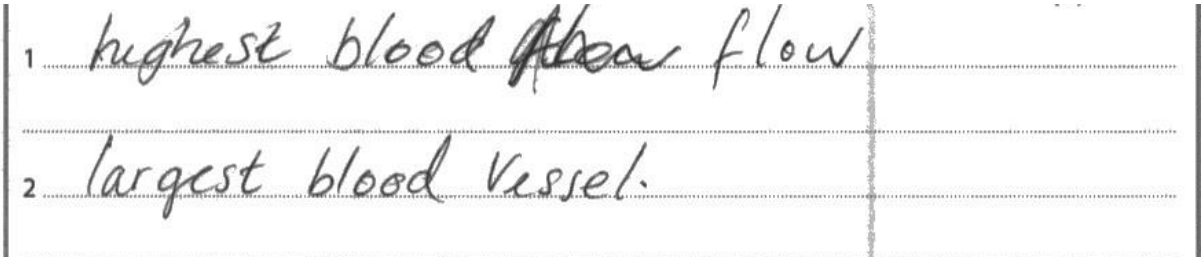
Higher scoring response



Specification reference B2.2

Rewardable material includes thick walls and muscular walls. The third point is incorrect.

Lower scoring response



The term 'highest' is meaningless in this context, it is arguably the vena cava. Both the vena cava and the aorta have the same blood flow, it is the volume and speed that differ and it is not a feature.

(b) Explain **two** long-term effects of hypertension.

Higher scoring response

(4)

1 Stroke due to big risk of a blood clot.

2 If pressure becomes too high, could lead to early mortality rate, if not treated.

The learner has identified the risk of stroke caused by a blood clot. The second statement is too generic and not rewardable.

Lower scoring response

1 Shakeiness or being unsteady when walking or holding objects.

2 Shadowing on the lungs making it harder to breath.

The learner has confused hypertension with other disorders and has not recognised that hypertension itself is symptomless.

(c) Describe how the cardiac cycle is controlled.

Higher scoring response

The Cardiac Cycle like all bodily functions originates from the Central nervous System (CNS), where the brain trasmits through the spinal cord the message for the heart to beat. The heart itself is made up of cardiac muscle, the only Muscle type which never tires which needs a constant Supply of energy in order to support life. The rythem of the heart is controlled by a small cardiac node (synoatrial node), which from the impulses sent by the brain, ensures that the heart beats. This is essentially what happens during every day relaxation where the heart is under little Stress, however when the body is under stress such as when moving where the heart needs to push more oxygen around the body, the CNS will recognise this and the impulse to beat faster will occur. The cardiac cycle is also influenced by hormones such as adrenalin which cause the bodies fight or flight response and causes the heart to beat again for more oxygen to the muscles.

Specification reference B2.1

The learner has described the control of the cardiac cycle accurately and included sustained coverage of the interrelationship with the nervous and endocrine systems. There is a chain of reasoning that demonstrates good organisation. A level three answer.

Lower scoring response

The cardiac cycle is the movement of blood throughout your heart. It is controlled involentarily, which means your body does it naturally and our brain doesn't have to tell it what to do.
The cardiac area in our body is covered in cardiac tissue and muscel.
Cardiac tissue is made up of groups of cells that all work together to perform a function in this case is to keep the heart beating and working.
Cardiac muscel is the actual muscel surrounding the heart that contracts and relaxes to beat the heart and push the blood to the rest of the body, and lungs.
The cardiac cycle is also controlled by valves throughout the heart. There is the tricuspid valve on the right side, and the bicuspid on the left. But there is also pulmary valve before the blood goes to the lungs and a aortic valve before the blood goes to the body.
The valves main job is to make sure blood doesnt go back on itself and it pumps in the right direction.

The learner has described the structure of the heart and the cardiac cycle well. However, they have not discussed the control of the system, so there is limited attempt to answer the question. A level 1 answer.

6 (a) (i) Define diagnostic testing.

Higher scoring response

Screening for genetic diseases

Specification reference A5.3

An accurate definition.

Lower scoring response

a way to diagnose certain diseases.

The learner has reworded the question without either linking it to genetic disorders or finding the cause of pre-existing symptoms.

(ii) Explain amniocentesis.

Higher scoring response

This is where a needle is inserted into the amniotic sac of a child while still in ~~utero~~ the uterus in order to obtain a sample of amniotic fluid for the cells it contains. This type of testing is used in order to identify whether a child has a genetic disorder in order to prepare parents and medical staff of the possibility of the best treatment.

Specification reference A5.3

The learner has identified the removal of amniotic fluid with a needle to identify genetic disorders. The could have gone on to explain that the identification would have to be done under a microscope or by DNA analysis

Lower scoring response

amniocentesis is used during pregnancy and is used to check whether the baby has any chromosome disorders.

The learner has identified that it is used to check for chromosome disorders but has not explained how the test does that.

(iii) Explain **two** examples of congenital disorders.

Higher scoring response

1 one example of a congenital disorder is spina bifida and this is because of the fact that the mother does not ensure the childs safety during their pregnancy meaning that they drink alcohol, smoke, drugs and this results in the child with this condition meaning that ~~they can't~~ their spine has not developed effectively so they can't walk however they need a wheelchair to move. The child may have learning difficulties.

2 Another congenital disorder is foetal alcohol syndrome and this is due to excessive amounts of alcohol during pregnancy and therefore the child is born with a small head as their brain has not developed effectively. As a result of this ~~they~~ the child may have learning difficulties. The child is also born with a low mass.

Specification reference B11.4.3

The learner has accurately identified two congenital disorders and gone on to explain them, including two expansions for each identification thus gaining full marks. There is some inaccuracy, particularly the incorrect identification of the cause of spina bifida but there is still enough rewardable material.

Lower scoring response

1 ~~Congenit~~Congenital disorders mean present at birth so an example of this would be down's syndrome. This disorder is present on birth as it is a genetic fault in chromosomes which means the individual has an extra chromosome on the 21st pair.

2 Another disorder that is present at birth is phyukentorunia. This is either present at birth or not in an individual. The way that an individual is tested for this is by the heel prick test. Which is pricking a child's foot when it's born. It is a disorder that affects phenyalnine in the body and can lead to learning difficulties.

One congenital disorder has been identified and there is one expansion point. This is Down's syndrome caused by an extra chromosome, there is no more expansion.

PKU is an inherited disorder, not a congenital disorder so is not rewardable.

(b) Two parents are carriers for the gene for PKU.

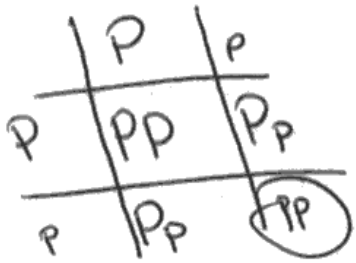
What is the probability of them having a child who suffers from PKU? Show your working.

Higher scoring response

Pku is the recessive allele so you need the 2 same alleles to code for the gene. If parents are carriers their alleles will be heterozygous as will have one dominant allele and one recessive allele. The dominant allele will code for the ~~Poor~~ Phenotype so makes parents a carrier.

Pp Pp

Both parents allele code.



This is a punnet Square used to show the Probability of an individual having a genetic condition

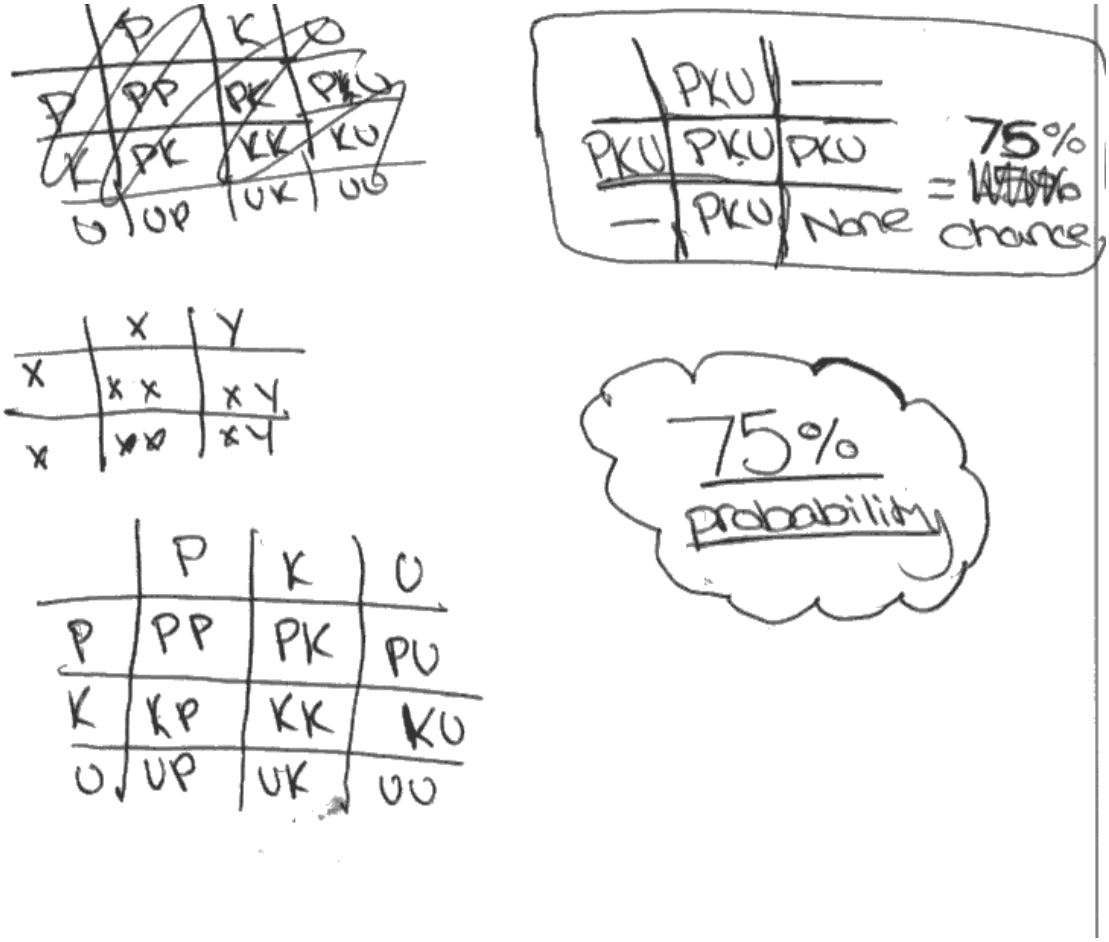
There is a 75% chance that the baby will carry PKU and a 25% chance that the baby will suffer from PKU.

Pku is the genetic condition also called Phenylketonuria.

Need 2 or the same genotypes whichare recessive to code for this genetic condition. So there genotypes will be homozygous.

Specification reference A5.1
The learner has use an appropriate Punnett square, identified that the parents are heterozygous and the gene for PKU is recessive. They have then gone on to identify that only one of the potential genotypes will lead to a child having the phenotype of PKU. They show that the chance of 1 in 4 is a 25% probability. They have misidentified the homozygous dominant as a carrier, but here are enough accurate points in the rest of the answer to justify full marks.

Lower scoring response



This learner has tried to remember the structure of a Punnett square, but has not accurately identified the genotype of the parents and has too many columns on the squares. This has resulted in an incorrect probability being calculated and no rewardable material.

7 To what extent do you think that chorionic villus sampling is a safe procedure?

Refer to the article in your answer.

Higher scoring response

Chorionic Villus ~~Biop~~ Sampling (CVS) like all medical procedures has risks and thus can never be totally Safe. The risks associated with CVS have a ~~loss~~ death rate which is 0.8% higher than amniocentisis and a ~~loss~~ death rate of 7.2% altogether which essentially means that 7 out of 100 pregnancies that ~~result~~ have CVS result in childloss which is not a very high figure but it is still a risk which parents to be would have to take into account. As mentioned earlier amniocentisis may be a better option as it is relatively safer though it occurs later than CVS which may indeed be a factor. Based on these statistics alone it would be ~~possible~~ possible to say that CVS is a relatively Safe medical procedure with minimal risk especially when one considers that only 2.9% of women who only needed one attempt of CVS ~~resulted~~ had the loss of a child. However it would seem that ~~when~~ when repeated the procedure becomes much ore dangerous with figures rising to 10.8% making it Statisically less safe, thus one could say that CVS is a relatively safe procedure unless repeated

Specification reference A5.3/C1.4

The learner has demonstrated accurate and thorough knowledge and understanding of the relevant information. There are linkages and a judgement made. The well-balanced argument leads to a rationalised conclusion and there is logical reasoning and clarity. A level three answer.

Lower scoring response

I don't think that chorionic villus sampling is a safe procedure this is because it shows the amount of women who had this done several times has a lot higher percentage then those who only attempted this once it also shows that it has a higher rate of death whether it was abortions, still births. I don't think it's a safe procedure because it shows ~~thre~~ if the baby is going to have a dissorder when born some parents might not want the child so she would go and abort it this also increases the rates of ~~adopl~~ abortions. Also the chorionic villus sampling could not be true might say the child is going to have a dissorder but really doesn't.

There are isolated elements of knowledge with a basic description of the information. The arguments are generic assertions, e.g. 'it increases the rate of abortions'. There is not an adequate answer to the question, level 1.