



January 2018

**Level 3 National in
Health and Social Care:
Anatomy and Physiology
(31493H)**

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Grade Boundaries

What is a grade boundary?

A grade boundary is where we set the level of achievement required to obtain a certain grade for the externally assessed unit. We set grade boundaries for each grade, Distinction, Merit, Pass and Near Pass

Setting grade boundaries

When we set grade boundaries, we look at the performance of every learner who took the external assessment. When we can see the full picture of performance, our experts are then able to decide where best to place the grade boundaries – this means that they decide what the lowest possible mark should be for a particular grade.

When our experts set the grade boundaries, they make sure that learners receive grades which reflect their ability. Awarding grade boundaries is conducted to ensure learners achieve the grade they deserve to achieve, irrespective of variation in the external assessment.

Variations in external assessments

Each external assessment we set asks different questions and may assess different parts of the unit content outlined in the specification. It would be unfair to learners if we set the same grade boundaries for each test, because then it would not take into account that a test might be slightly easier or more difficult than any other.

Grade boundaries for this, and all other papers, are on the website via this link:

<http://www.edexcel.com/iwantto/Pages/grade-boundaries.aspx>

HEALTH AND SOCIAL CARE NQF BTEC Level 3 (31493H)

Grade	Unclassified	Level 3			
		N	P	M	D
Boundary Mark	0	9	18	34	50

Introduction

January 2018 was the first series for this external unit in Anatomy and Physiology for Health and Social Care.

The format of the paper followed the format established by the additional sample assessment material published on the Pearson website.

The paper consisted of seven questions, each based on an area of the specification. The questions were broken down into sub questions with different weightings from one to eight. The marks allocated reflected the command verb of the question, and therefore the level of detail required from the learner.

The extended responses were marked by a levels-based approach to allow learners to be credited for the skills they showed as well as the knowledge recalled.

Introduction to the Overall Performance of the Unit

On the whole learners performed better where they were allowed to explain or discuss their knowledge. Where recall was required in the shorter questions learners struggled to provide accurate and specific answers. There were cases where the learner demonstrated in other answers that they had the knowledge but had struggled to grasp the requirements of the question or provide a specific enough answer so lost marks. This suggested a lack of familiarity with this style of exam and poor exam technique were issues that centres would be advised to concentrate on.

Individual Questions

Question 1

Most learners could provide a basic definition of homeostasis

- Expect to comment on every question
- Give specific examples of learners' responses that performed well and examples that did not perform so well
- Give commentary for each example
- Consider how your examples and commentary reflect the overall performance of the external assessment
- Please see the following LE Report from June 2016 for the L2 external assessment for [Creative Digital Media Production](#).

Question 1a (i)

Most learners could provide a basic definition of homeostasis, or give temperature control as an example. Few learners could expand this to gain the three marks, either by talking about equilibrium and the efficient working of organs or the use of specific examples such as glucose or electrolyte levels.

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

(3)

Homeostasis controls internal conditions in the body. The role of homeostasis is to keep factors constant. These are factors such as pH levels, temperature and ion content. Sugar levels are also another factor that ^{needs to be} kept constant. Homeostasis is important because for the body to be controlled ^{and} it needs everything to be balanced.

Three marks awarded, factors constant (1), and two identified, pH, temperature, sugar etc. (2)

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

(3)

Homeostasis is the energy in the body that allows the body to function.

No marks awarded, the learner has not understood homeostasis.

Question 1aii

Some learners knew the role of the pituitary, the majority did not. This was straight recall

Question 1b

This question was poorly answered. Most learners provided answers referring to the role of the kidney in removing toxins or urea from the blood (often inaccurately) Very few referred to the role of the kidney in osmoregulation. The structure and function of the renal system is a separate section, B10, in the specification.

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

(4)

The kidneys are the main part of the renal system. Osmoregulation is controlling water levels and ensuring they are balanced and are in the correct range. The kidneys filter urine and if they detect low water levels in the urine, meaning urine is more concentrated, they absorb more water so that urine becomes more diluted and balanced.

1 mark awarded. Water levels are balanced, the rest of the answer is confused and has the process the wrong way around.

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

(4)

To filter the blood that is passed through your kidneys this is done so you don't get kidney diseases, water infections.

No marks awarded, the learner has not understood the word osmoregulation.

Question 1c

Learners generally knew the ureter was part of the renal system. They often confused it with the urethra. Answers were often not specific enough to gain marks at a level three.

(c) State the role of the ureter.

(1)

→ Connects the kidneys and bladder for urine to travel through

(Total for Question 1 = 9 marks)

This learner has identified the role of the ureter specifically and gained 1 mark.

(c) State the role of the ureter.

(1)

Ureter collects the urine that was stored in the bladder

(Total for Question 1 = 9 marks)

This learner knew that the ureter is part of the renal system but has not answered specifically enough to gain a mark.

2a

Many learners knew that amylases were to do with carbohydrates and proteases with proteins but few could expand their answers further than that. Many learners did not consider that there were four marks on offer and structure their answers accordingly.

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

Describe the roles of amylases and proteases in digestion.

(4)

Amylases break down starches carbohydrates and forms them into simple sugars and glyceride
Amylase is produced in ~~set~~ the salivary glands under the tongue and aid mastication.

Proteases break down proteins into peptides and amino acids which can then be absorbed into the bloodstream.

This learner has provided a full and specific answer, gaining full marks.

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

Describe the roles of amylases and proteases in digestion.

(4)

Amylases store things like carbohydrates and releases them when needed.

Proteases helps to store protein in the body during digestion.

No marks awarded, the learner has not understood the role of enzymes.

2b

Many learners knew that coeliac disease was a reaction to gluten. Many described it as an allergic reaction. Few learners could make the link to an autoimmune disease. Some learners seemed unfamiliar with the condition and confused it with many other, different conditions. This was a levelled based mark scheme and marks were available for accurate descriptions, they did not necessarily have to cover every specific symptom of coeliac disease.

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

(6)

This is an autoimmune disease which is caused by an adverse reaction to gluten. Gluten can be found in wheat and other cereals. Symptoms experienced may include abdominal pain, flatulence and diarrhoea. However this may be treated by the individual having a gluten-free diet.

This learner has demonstrated accurate knowledge and understanding, with correct technical language. Level 2 4 marks. A link to the effects of an autoimmune response on the intestine, and how this causes symptoms would have improved the answer.

3a

A lot of the responses seen were very generic, and generally referred to the role of the spleen in red blood cell recycling, without reference to the immune response. This suggested that learners could recall specific facts about the spleen but did not make the links between the different parts of the immune system.

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

(3)

is a reddish purple organ, which helps create lymphocytes. these find and destroy bacteria and unwanted abnormal cells in the body. It also will kill or destroy old lymphocyte or cells that are not needed. However the spleen is not needed to live. Therefore it helps with fighting disease and protecting body.

This learner has gained two marks, for the production of lymphocytes and the link to preventing infection.

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

(3)

The spleen helps the immune response because it helps pass messages on to the brain

No marks awarded, the role of the spleen is not known.

3b

This answer was very poorly answered. Learners knew that B and T cells were both white blood cells and some could make generic statements about white blood cells but few could go further than that, and learners rarely had the skills to be able to produce a comparison.

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

(4)

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 ~~to~~ foreign cell if it came into contact with the body.

Three marks awarded, both combat pathogens, 1 B cells involved on antibody production, T cells involved with the first response to bacteria (1).

3c

Many learners explained the effects of chemotherapy, e.g. hair loss. Rather than the symptoms of the leukaemia itself. Better answers could talk about the inability to fight infections. Learners often referred to symptoms that are the general effect of being ill, rather than specifically linked to leukaemia.

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

(4)

- 1 pale skin, as white blood cells are being over produced, there are less red blood cells which means less colour to the skin.
- 2 tiredness or fatigue due to the over producing of the white blood cells, ~~the red blood~~ there are less ~~blood cell~~ red blood cells, which carry oxygen around the body, meaning cells are not getting enough oxygen.

This learner has gained four marks.

Pale 1 fewer red blood cells 1

Tired 1 as anaemic/less oxygen available.

4ai

Those learners who had learned their cell structure generally got one mark. Few learners could expand their answers or recognized two marks were on offer. A significant minority confused ribosomes with other organelles, especially mitochondria.

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

(2)

Ribosomes helps to make protein.

One mark awarded, for protein production.

4aii

Learners could generally answer this question. They knew that ciliated cells were epithelia.

4b1

Learners struggled with the word adapted. Some descriptions of nerves were seen but these were rarely linked to the impulse itself. A levelled mark scheme to allow learners to expand on the points they knew.

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

(6)

Neurons are composed of an axon, cell body and dendrites. The dendrites at the end of the neurons allow an impulse to be received quickly. The axon is protected by the myelin sheath which protects the axon and allows information to be passed quickly. Neurons have synapses which allow ~~impulses~~ impulses to be passed on effectively. Synapses link nerve cells together.

Five marks awarded. The answer demonstrates accurate knowledge and understanding. There is sustained coverage of the features of nerve cells. There could have been a more specific reference to the passage of the nerve impulse to gain full marks.

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

(6)

Neurons change shape when they need to pass through the body. This helps them pass on impulses round the body easily. The neurons help pass on impulses round the body and help tell the body what to do.

No marks awarded, the learner did not understand the term neuron.

4bii

Learners struggled with this question and often confused the endocrine system with the nervous system. Those learners who referred to the endocrine system specifically often referred to specific glands and hormones but did not talk more generally about hormones being passed through the blood supply and receptors on target organs being stimulated.

(ii) Explain how the endocrine system transmits messages.

(4)

The endocrine system is ductless glands scattered around the body. It transmits messages through the blood stream because that is how hormones travel round the body.

Two marks awarded. Hormones produced 1 that travel through the blood 1. If the next part about then hitting receptors on target organs had been made, full marks would have been obtained.

4c

There was a definite disparity between those learners who were familiar with the condition and those who appeared to be very unfamiliar with it. This did not seem to link to the ability of the learner.

The better learners could talk about the disruption to the nerve impulse, and the effect on either motor skills or brain function.

Multiple Sclerosis is a muscular condition which occurs as a result of the neurons in the brain dying off. This means that one symptom of MS includes the inability to complete a movement. This is because electrical impulses will struggle to connect so that you cannot complete the action. As a result of this, an individual could start to become depressed and have a reduced health & well being because they feel incapable.

2 marks awarded, impulses not getting through leading to mobility issues.

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

(4)

One symptom is energy loss and build up of sticky mucus in the trachea.

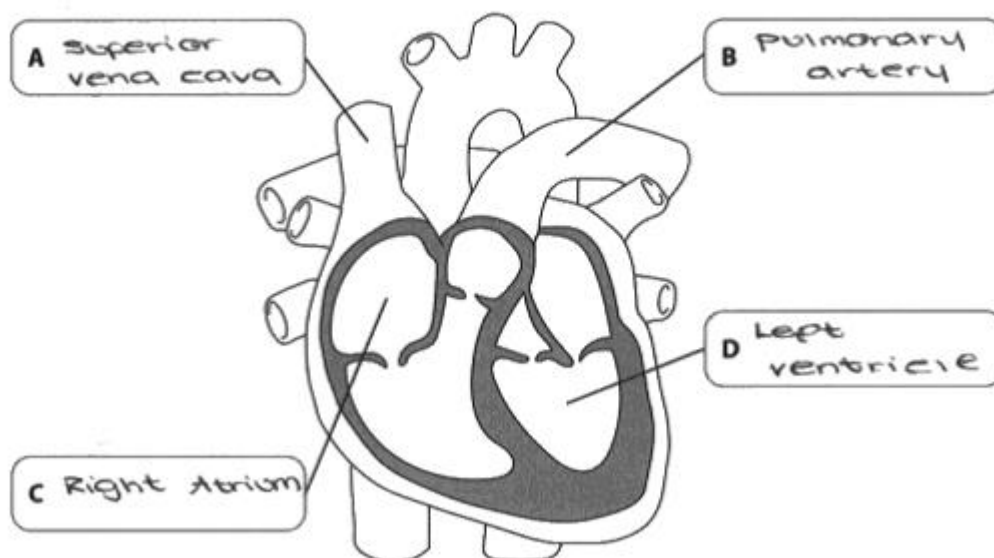
No marks awarded, the learner has confused the condition with cystic fibrosis.

5ai

Learners either knew or did not know this, with a few making imaginative guesses. For those who knew their heart structure the only problem was the pulmonary artery which was sometimes identified as the vein.

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

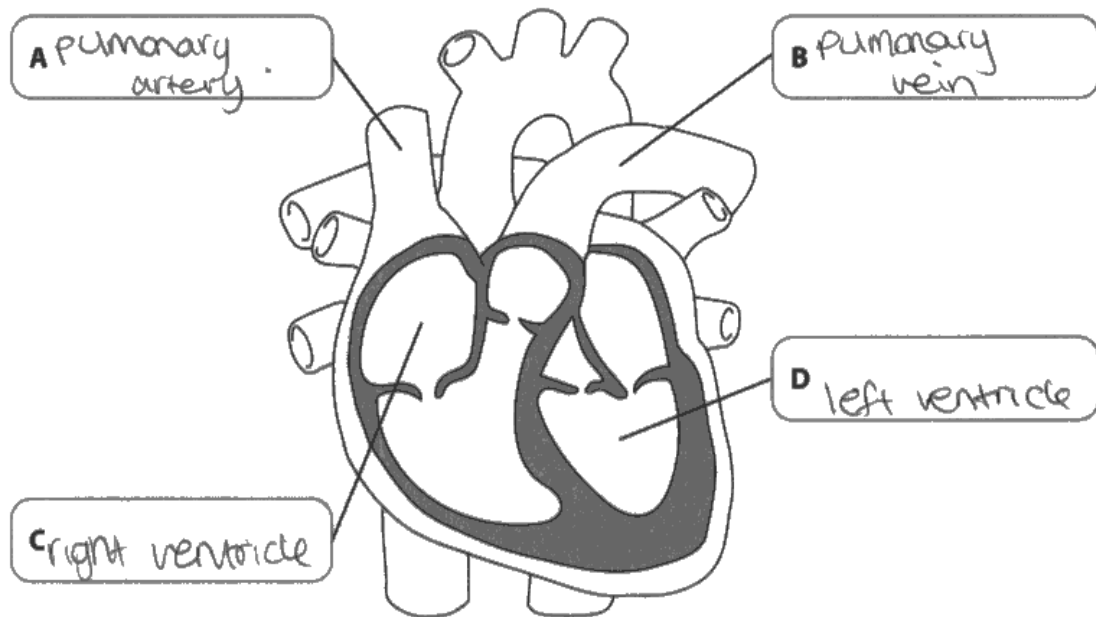
(4)



Full marks awarded.

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

(4)



One mark awarded, the left ventricle is correctly identified.

5a ii

Any problems caused by this question tended to be problems with the language of the question. Some learners struggled with the word features and wrote anything they knew about arteries. A significant minority listed the differences between arteries and veins, forgetting about capillaries (and the pulmonary vessels)

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

(2)

1. The ~~biggest~~ biggest blood vessel
2. carries oxygenated blood around the body.

No marks awarded, they are not the only vessels that carry oxygenated blood, and 'biggest' is a generic word that could be claimed by the vena cava.

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

(2)

1. Thick muscular walls

2. Elastic so have a higher pressure

Two marks awarded, thick walls 1, elastic walls 1 (muscular walls could also have been credited)

5b

There were very few full mark answers to this question. Learners did not appreciate that hypertension is a 'silent' condition with no symptoms. Those who gained marks could identify increased chance of heart attack and stroke as long-term effects.

(b) Explain **two** long-term effects of hypertension. → chronic high blood pressure.

(4)

1. Coronary heart Disease due to extremely high blood pressure.

2. Weakened heart walls due to the pressure exerted on them.

One mark for the increased chance of coronary heart disease.

6c

Many learners misread this question and described the cardiac cycle rather than the control of the cycle. The reference in the specification is to the regulation of the heart rate, but few learners could make the link between the heart rate and the cardiac cycle, or the regulation and control. This was unfortunate as some of the answers showed that the learners knew the cardiac cycle well. Higher level learners are expected to be able to make links between body systems, there was opportunity here that was rarely seen.

The cardiac cycle is an involuntary process controlled by the autonomic nervous system. The heart is continuously beating, meaning blood is always moving. The deoxygenated blood, venous blood, is carried to the heart through veins, it travels through the heart and to the lungs where it becomes oxygenated, arterial blood, it travels back to the heart where it is transported through arteries to the rest of the body.

The learner starts the answer well, identifying the involuntary nature of the process. However, they then do not go on to talk about how the nervous system controls things. The answer is level 1, showing isolated elements of knowledge and understanding but limited attempt to address the question.

(c) Describe how the cardiac cycle is controlled.

(8)

The cardiac cycle is controlled by the ~~heart~~ brain, sympathetic and parasympathetic systems. The sympathetic system tells the heart when to increase ~~the~~ pumping like in times of exercise or shock by releasing adrenaline. The parasympathetic system acts the opposite and controls the steady heart rate at times of rest and calmness. The brain and sympathetic/parasympathetic systems can send nerve impulses to indicate when heart rate is needed to be increased (fight or flight) and when it is needed to be steadied. This then increases the heart rate by making the heart contract faster and therefore pump increasing blood flow and heart rate.

A level three answer, the learner has understood the question and answered appropriately. There are links between the cardiac, nervous and endocrine systems. The parasympathetic and sympathetic nervous systems are described accurately.

6ai

Learners answered this well, some answered the question generally, some in terms of genetic testing specifically. Where answers were poor they tended to rephrase the question. 'testing to diagnose something' where they needed to go on to stipulate that the test was to find the cause of a preexisting symptom, rather than general screening.

6aii

Learners answered this well. Those who knew it generally were awarded 3 marks, they did not take the explanation on to say that the chromosomes have to be examined under a microscope or similar.

Amniocentesis is what parents do during pregnancy to see if there are any defects. The doctors use a needle ~~what~~ then they get a sample of fluid from the amniotic sac to see if the ~~fo~~ baby has a illness. Amniocentesis can cause miscarriages. Amniocentesis is to see if there are any chromosome disorders.

Three marks awarded, needle 1, sample of fluid from the amnion 1, identify chromosome disorders 1.

6a iii

Where learners knew this topic, there were some excellent answers seen. Some learners did not know the difference between congenital disorders and genetic disorders. There is a list of congenital disorders in the specification under B11 that can be used to illustrate this. Genetic disorders come under A5. The only exception is Down's syndrome which is a chromosome disorder, that many people consider to be congenital and was accepted as a valid answer on this paper.

1. foetal alcohol syndrome which is caused by alcohol being consumed by the mother whilst pregnant. It causes specific facial features, developmental delay (physically, cognitively) and can lead to issues with attention span and behavioural problems.
2. Down syndrome is caused when a child has one extra chromosome (47 not 46 like ~~normal~~ ^{expected}). It causes characterised facial features, developmental delay both physically and cognitively - leading to huge learning difficulties.

Two identified accurately, foetal alcohol syndrome and Down's syndrome which are then explained fully for six marks.

6b

Most learners answered this well. Where they had learnt to do a Punnett square they picked up marks quickly. Some learners did not explain the probability of the child having PKU well once they had worked out the genetics. They needed to identify that the sufferer is homozygous recessive and the parents were heterozygous, and 3:1 is a 25% probability.

X	P	p
P	PP	Pp
p	Pp	pp

→

PKU is a recessive allele disorder.
Both parents carry a recessive 'p'.

As circled, they have a 1 in 4 chance (25%) of having a child with PKU. This is because PKU is a recessive disorder meaning that 2 recessive (small) alleles are needed for the person to have PKU.

Six marks awarded, a correct Punnett square with parents identified as having one recessive allele, the probability, is identified correctly (1 in 4 is 25%)

7

This question was answered well. It gave the learners with some understanding of the unit, who struggled to recall facts an opportunity to demonstrate their understanding. This demonstrated that they can apply exam technique when given information.

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

Refer to the article in your answer.

Chorionic villus sampling involves taking tissue of the placenta ^{with} the assistance of a needle. Many women who undertake this method of genetic diagnosis are warned about the risks including miscarriage or injury to their fetus as there is no way to determine the safety ^{of the fetus} when poking the needle through. As this is carried out during the first trimester, it is more likely to cause danger and be a risky procedure for the developing fetus. The article provides us with significant statistics which highlight the risks of chorionic villus sampling in comparison to amniocentesis. For example, the total of abortions, terminations, stillbirths and neonatal deaths for the group testing with CVS was 8% (after the figure adjustment) which is 2.3% higher than the combined losses of women undertaking the amniocentesis ^{procedure}. This suggests that there are lower risk factors when being tested for genetic ^{diseases} compared with amniocentesis. It also mentions that a numerous amount of attempts were made to take a sample with CVS (10.8%) compared to the much lower percentage of needing one successful attempt (2.9%) which ^{suggests} that this procedure may be difficult to carry out successfully on the first attempt. This is dangerous/risk factor to consider due to the fact that the more attempts made will be more likely to injure the fetus and ^{overall, CVS is a risky procedure to carry out} (Total for Question 7 = 8 marks)

A level three answer, there are interrelationships made leading to a judgement, and the answer is well developed and balanced with logical reasoning.

Summary

Based on their performance on this paper, learners should

- Revise and be able to recall the basic anatomy of the body systems as listed in the specification
- Learn the functions of the systems listed and be able to link the functions to the relevant anatomy.
- Use the additional sample assessment material and other support material available on the website to practice answering exam questions, paying particular note of the command verbs and marks available to structure their answer.
- Ensure that they can make links between the different body systems listed in the specification and describe the interrelationships.
- Use as many resources as possible, including exam papers from other related subject areas, e.g. 'A' level biology to become as conversant as possible with the command verbs used, and how they link to the structure of the answers required.

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