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BTEC

Mark Scheme (Results)

January 2018

BTEC Level 3 National in Health and Social Care Unit 3: Anatomy and Physiology for Health and Social Care (31493H)

Health and Social Care

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Unit 3: Anatomy and Physiology for Health and Social Care

General marking guidance

- All learners must receive the same treatment. Examiners must mark the first learner in exactly the same way as they mark the last.
- Marking grids should be applied positively. Learners must be rewarded for what they have shown they can do, rather than be penalised for omissions.
- Examiners should mark according to the marking grid, not according to their perception of where the grade boundaries may lie.
- All marks on the marking grid should be used appropriately.
- All the marks on the marking grid are designed to be awarded. Examiners should always award full marks if deserved. Examiners should also be prepared to award zero marks, if the learner's response is not rewardable according to the marking grid.
- Where judgement is required, a marking grid will provide the principles by which marks will be awarded.
- When examiners are in doubt regarding the application of the marking grid to a learner's response, a senior examiner should be consulted.

Specific marking guidance

The marking grids have been designed to assess learner work holistically. Rows in the grids identify the assessment focus/outcome being targeted. When using a marking grid, the 'best fit' approach should be used.

- Examiners should first make a holistic judgement on which band most closely matches the learner's response and place it within that band. Learners will be placed in the band that best describes their answer.
- The mark awarded within the band will be decided based on the quality of the answer, in response to the assessment focus/outcome and will be modified according to how securely all bullet points are displayed at that band.
- Marks will be awarded towards the top or bottom of that band, depending on how they have evidenced each of the descriptor bullet points.

BTEC Next Generation Mark Scheme

Unit 3: Anatomy and Physiology for Health and Social Care

Question Number	Answer	Mark
1ai	Any three from the following. • Maintenance of an internal environment (1) • How our body keeps its systems in equilibrium (1) • Allow organs to work efficiently (1) • Maintenance of a stable temperature (1) • Maintenance of fluid/water balance in the body (1) • Maintenance of glucose levels (1) • Maintenance of electrolyte levels (1) • Maintenance of pH (1)	3

Question Number	Answer	Mark
1aii	Pituitary (1)	1

Question Number	Answer	Mark
1 b	Award **one** mark for the identification and **three** additional marks for the appropriate explanation to a maximum of **four** marks. **Identification** • Maintains the fluid balance on the body/ removes water from the blood (1) **Expansion** • This happens at the renal corpuscle (1) (accept glomerulus/Bowman's capsule). • Prevents dehydration (1). • Increases the amount of water reabsorbed (1). • At the proximal tubule electrolytes are reabsorbed (1). • In the Loop of Henle water re-enters capillaries maintaining osmotic potential of the blood (1). • In the distal tubule water is reabsorbed under the influence of ADH (1).	4

Question Number	Answer	Mark
1c	Carries urine from the kidney to the bladder	1

Question Number	Answer	Mark
2a	**One** mark for each identification to a maximum of **two** and **one** mark for each expansion to a maximum of **two**. **Total mark four**. • Amylases catalyse the breakdown of carbohydrates (1) into simple sugars (1). • Proteases catalyse the breakdown of proteins (1) into amino acids (1). Do not accept "they are enzymes".	4

<table>
<tr><th>Question number</th><th colspan="2">Indicative content</th></tr>
<tr><td>2b</td><td colspan="2">Coeliac disease is an autoimmune disease.

Cause

• It is caused by a reaction to chemicals in gluten.
• The immune response attacks the lining of the small intestine.

Symptoms/short-term effects include:

• Feelings of sickness/nausea
• Sufferers may become constipated
• People may lose weight quickly
• People get diarrhoea, which may smell particularly unpleasant
• It causes bloating and wind
• abdominal pain
• feeling tired all the time as not enough energy absorbed from food
• Long-term effects could include: osteoporosis, iron deficiency/anaemia and vitamin deficiency
• Diarrhoea.

Band 3 answers should link the identified effects to the causes of the disease.</td></tr>
<tr><td colspan="3">Mark scheme (award up to 6 marks) refer to the guidance on the cover of this document for how to apply levels-based mark schemes*.</td></tr>
<tr><th>Level</th><th>Mark</th><th>Descriptor</th></tr>
<tr><td>Level 0</td><td>0</td><td>No rewardable material.</td></tr>
<tr><td>Level 1</td><td>1–2</td><td>• Demonstrates isolated elements of knowledge and understanding.
• Provides little or no reference to the cause or effect of coeliac disease
• Generic statements may be presented, rather than linked factors/components being identified and explored in the context of the digestive system. Limited attempt to address the question.
• Response is likely to lack clarity, organisation and the required technical language.</td></tr>
<tr><th>Level</th><th>Mark</th><th>Descriptor</th></tr>
<tr><td>Level 2</td><td>3–4</td><td>• Demonstrates accurate knowledge and understanding.
• References to cause and/or effect of coeliac disease are present.
• Learners will identify linked factors/components, with some development in the form of mostly accurate and relevant factual material. The accuracy in the detail on the factors identified is likely to vary.
• The response may contain parts that lack clarity or proper organisation. Evidence of correct technical language being used.</td></tr>
<tr><td>Level 3</td><td>5–6</td><td>• Demonstrates accurate knowledge and understanding.
• Sustained coverage of cause and effect of coeliac disease</td></tr>
</table>

		• Might demonstrate the ability to integrate and synthesise relevant information about the digestive system. • A contextualised analysis of the cause and effect of coeliac disease is developed using mostly coherent chains of reasoning, leading to a range of factors/components being present. • Learners will demonstrate understanding of linkages and relationships between/within systems. • Response demonstrates good organisation, clarity and use of technical language.

Question Number	Answer	Mark
3a	**Identification** • Produces white blood cells/lymphocytes (1) **Expansion** • The white blood cells then produce antibodies (1) • The spleen then stores white blood cells/lymphocytes (1) • This allows lymphocytes to scan the blood for bacterial infection (1) Maximum of **two** marks for expansion points.	3

Question Number	Answer	Mark
3b	**One** mark for each identification to a total of **four.** • Both are white blood cells (1) • Both involved in combating pathogens (1) • T cells activate phagocytes (1) • B cells are involved in antibody production (1) • B cells Present antigens to T cells (1) • T cells activate B cells (1) A maximum of **three** marks for a one sided answer. Accept other appropriate wording.	4

Question Number	Answer	Mark
3c	**One** mark for each identification to a maximum of **two. One** mark for each expansion to a maximum of **two**. Total of **four** marks. • Feeling tired/ breathless (1) as anaemic (1) • Pale complexion (1) as fewer red blood cells (1) • Frequent infections (1) due to lack of white blood cells (1) • Unusual/frequent bleeding (1) due to a low platelet count (1) • Easily bruised skin (1) as blood doesn't clot (1) • A feeling of fullness/discomfort (1) as the liver/ spleen is swollen (1)	4

Question Number	Answer	Mark
4ai	Any two from Protein synthesis (1) Joins together amino acids (1) Translates (messenger) RNA (1) Contains (transfer) RNA (1) Accept any other appropriate wording.	2

Question Number	Answer	Mark
4aii	Epithelium (1)	1

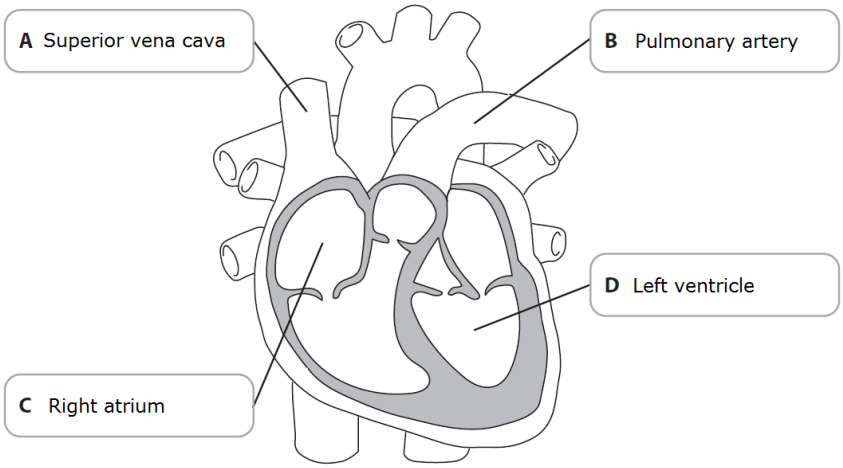
Question number	Indicative content
4bi	• The cells/axons are long so they can transmit impulses over distances. • Synapses allow messages to pass from one cell to another. • Myelin sheath allows the nerve impulse to travel quickly. This is via the nodes of Ranvier. • The myelin sheath is made of Schwann cells • Ion channels in the cell membrane allow depolarisation which is how the nerve impulse is transmitted. • Vesicles/cell membrane release neurotransmitters/ named neurotransmitter e.g. dopamine at the synapse. • The cell membrane has receptors for the neurotransmitters. • The branched dendrites receive impulses from other nerve cells. • Some candidates may include a diagram

Mark scheme (award up to 6 marks) refer to the guidance on the cover of this document for how to apply levels-based mark schemes*.

Level	Mark	Descriptor
Level 0	0	No rewardable material.
Level 1	1–2	• Demonstrates isolated elements of knowledge and understanding. • Provides little or no reference to features of nerve cells • Generic statements may be presented, rather than linked factors/components being identified and explored in the context of the nervous system. • Response is likely to lack clarity, organisation and the required technical language.
Level	**Mark**	**Descriptor**
Level 2	3–4	• Demonstrates accurate knowledge and understanding. • References to features of nerve cells are present. • Learners will identify some linked factors/components, with partial development in the form of mostly accurate and relevant factual material. The accuracy in the detail on the factors identified is likely to vary. • The response may contain parts that lack clarity or proper organisation. Evidence of correct technical language being used.
Level 3	5–6	• Demonstrates accurate knowledge and understanding. • Sustained coverage of features of nerve cells • Might demonstrate the ability to integrate and synthesise relevant information about the nervous system. • Learners will demonstrate understanding of linkages and relationships within the nervous system. • Response demonstrates good organisation, clarity and use of technical language.

	Answer	Mark
4bii	Award **one** mark for the identification and **three** additional marks for the appropriate explanation to a maximum of **four** marks. • Endocrine glands produce hormones (1). • They release hormones directly into the blood stream (1). • The blood stream transports the hormones to all parts of the body (1) • Receptors on the target organ are stimulated by the hormone (lock and key hypothesis (1). Marks can be awarded for explanation without identification to a maximum of **three** marks. Accept alternative wording.	4

	Answer	Mark
4c	**One** mark for the identification and **three** for the explanation to a total of **four** marks. **Identification (1)** • Difficulty speaking/ swallowing/ breathing/ mobility/ bladder/bowel function/ balance and coordination • Increased confusion • Memory problems • Vision problems • Weakness **Explanation (up to 3 marks)** • The body attacks the nerve cell/Autoimmune attack on the myelin sheath (1). • The insulation/myelin sheath is lost/neurones become exposed (1). • Nerve impulses become slow/ disrupted/messages do not get through (1). • The muscles do not react (for motor symptoms) (1) • The nerves in the brain do not function correctly (for confusion/memory/vision) (1) • Weakness (1) **The explanation must link correctly to the identified symptom** Accept any other valid response.	4

	Answer	Mark
5ai	A - Vena cava. B - Pulmonary artery C - Right atrium D - Left ventricle  	4

	Answer	Mark
5aii	• Small lumen (1) • Relatively thick walls (1) • Muscular walls (1) • Elastic walls (1) • No valves (1)	2

	Answer	Mark
5b	**One** mark for each identification to a maximum of **two.** One mark for each expansion to a maximum of **two.** Total **four** marks. • This can cause long-term damage to blood vessels (1) which can lead to an increased chance of heart attack/heart failure (1). • Increased chance of stroke/vascular dementia (1) if blood vessels in the brain affected (1). • Increased chance of kidney disease (1) as renal artery affected (1). • Increased chance of visual impairment (1) due to bleeding in the retina (1). Accept appropriative alternatives.	4

Question number	Indicative content
5c	• The cardiac cycle is one complete 'heartbeat' when the ventricles and atria have all contracted. • Cardiac muscle is auto-rhythmic/myogenic/beats by itself • The nerves control the speed it beats • The cardiovascular centre in the brain sends messages to the heart. • The parasympathetic/vagus nerve nervous system sends messages that slow the heart rate down • The sympathetic nervous system/ sends messages to speed up the heart rate. • Messages come to the sinoatrial node (SA node)/pacemaker • The SA sends messages to the heart muscle controlling the beat • Messages are sent to the heart muscle up the purkinje fibres. • The brain detects changes in blood pressure and carbon dioxide levels. • Hormones can speed up the messages from the brain • Adrenaline can cause the SA node to speed the heart up.

Mark scheme (award up to 8 marks) refer to the guidance on the cover of this document for how to apply levels-based mark schemes*.

Level	Mark	Descriptor
Level 0	0	No rewardable material.
Level 1	1–2	• Demonstrates isolated elements of knowledge and understanding. • Provides little or no reference to relevant interrelationships of body systems. • Generic statements may be presented, rather than linked factors/components being identified and explored in the context of the cardiac cycle. Limited attempt to address the question. • Response is likely to lack clarity, organisation and the required technical language.
Level	**Mark**	**Descriptor**
Level 2	3–5	• Demonstrates accurate knowledge and understanding. • References to relevant interrelationships of body systems are present. • Learners will identify linked factors/components, with some development in the form of mostly accurate and relevant factual material, leading to an analysis of the cardiac cycle in the context being presented. The accuracy in the detail on the factors identified is likely to vary. • The response may contain parts that lack clarity or proper organisation. Evidence of correct technical language being used.
Level 3	6–8	• Demonstrates accurate knowledge and understanding. • Sustained coverage of relevant interrelationships of body system is present. Might demonstrate the ability to integrate and synthesise relevant information about the cardiac cycle

		• A contextualised analysis of cardiac cycle is developed using mostly coherent chains of reasoning, leading to a range of factors/components being present. Learners will demonstrate understanding of linkages and relationships between/within systems. • Response demonstrates good organisation, clarity and use of technical language.

	Answer	**Mark**
6ai	• Testing that identifies the cause of a symptom (1) • Testing that identifies genetic disorders (1) Accept any appropriate other wording.	1

	Answer	**Mark**
6aii	**One** mark for the identification and **three** for the explanation to a total of **four** marks. **Identification** • Removal of a sample from the amniotic fluid (1) **Expansion** • A long needle is guided by an ultrasound image (1). • The chromosomes are examined under a microscope (1) • This can diagnose congenital problems (1) • E.G Down's syndrome (1). • DNA testing can be carried out (1) • This can diagnose genetic problems (1) • E.G cystic fibrosis (1).	4

	Answer	Mark
6aiii	**One** mark for each example to a maximum of **two**. **One** mark for each expansion to a maximum of **two** for linked to each effect giving a total of **six** marks. • Rubella infection in pregnancy (1) causes defects in the baby (1) such as deafness (1). • Spina bifida (1) is the incorrect development of the spinal cord (1) causing mobility problems/bowel problems (1). • Cerebral palsy (1) is caused by a lack of oxygen to the baby's brain during birth (1) and it can lead to mobility problems/learning difficulties (1). • Down's syndrome (1) is an extra chromosome (1) leading to developmental problems/learning difficulties/heart defects (1) • Foetal alcohol syndrome (1) due to mother drinking during pregnancy (1) leads to learning difficulties/development problems (1). Accept any other appropriative alternatives.	6

Question number	Indicative content	Mark
6b	Award 1 mark for each correct point to a maximum of **six** • Appropriate pedigree diagram/punnet square (1) • Parental genotype must be Pp (may be included in the punnett square) (1) • This is because they are carriers (1). • The gene for PKU is recessive (1). • Parents of genotype Pp could have children of genotypes PP, Pp and pp (may be included in the punnett square) (1) • In the ratio 1PP: 2Pp: 1pp • This means that the ratio of phenotypes is 3 normal to 1 affected, • An affected child has the probability of 25% of being born to these parents (1).	6

Question number	Indicative content
7	• CVS causes only 2.9% loss where 1 attempt needed. • CVS causes 10.8% loss where 3 or 4 attempts needed. • CVs does not cause serious maternal infections • 2.9% is high if you are an affected parent. • Depends on the capability of the practitioner to make a successful first attempt. • Rate of combined losses about 30% higher than amniocentesis.

Mark scheme (award up to 8 marks) refer to the guidance on the cover of this document for how to apply levels-based mark schemes*.

Level	Mark	Descriptor
Level 0	0	No rewardable material.
Level 1	1–2	• Demonstrates isolated elements of knowledge and understanding of relevant information; there may be major gaps or omissions. • Provides little evidence of application and links between relevant information. Response likely to consist of basic description of information. • Arguments may be presented, but are likely to be generic assertions rather than supported by evidence. • Meaning may be conveyed but in a non-specialist way; response lacks clarity and fails to provide an adequate answer to the question.
Level 2	3–5	• Demonstrates accurate knowledge and understanding of relevant information with a few omissions. • Evidence of application demonstrating some linkages and interrelationships between factors leading to a judgement being made. • Arguments are presented leading to conclusions being arrived at, but some may be lacking support. • Demonstrates the use of logical reasoning, clarity, and appropriate specialist technical language.
Level 3	6–8	• Demonstrates accurate and thorough knowledge and understanding of relevant information; any gaps or omissions are minor. • Evidences thorough application containing linkages and interrelationships between factors leading to a judgement being made. • Displays a well-developed and balanced argument leading to rationalised conclusions. • Demonstrates the use of logical reasoning, clarity and appropriate specialist technical language.

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