NCFE CACHE Level 3 Extended Diploma in Health and Social Care (Adults) (Northern Ireland) (603/5355/7)

NCFE CACHE Technical Level 3 Extended Diploma in Health and Social Care (601/8435/8)

Unit title: Anatomy and physiology for health and social care

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Assessment code: HSCNI/SAE
Paper number: P001444

Mark Scheme

v1.0 Pre-standardisation

This mark scheme has been written by the Assessment Writer and refined, alongside the relevant questions, by a panel of subject experts through the external assessment writing process and at standardisation meetings.

The purpose of this mark scheme is to give you:

- examples and criteria of the types of response expected from a learner
- information on how individual marks are to be awarded
- the allocated assessment objective(s) and total mark for each question.

Marking guidelines

General guidelines

You must apply the following marking guidelines to all marking undertaken throughout the marking period. This is to ensure fairness to all learners, who must receive the same treatment. You must mark the first learner in exactly the same way as you mark the last.

- The mark scheme must be referred to throughout the marking period and applied consistently. Do not change your approach to marking once you have been standardneed ised.
- Reward learners positively giving credit for what they have shown, rather than what they might have omitted.
- Utilise the whole mark range and always award full marks when the response merits them.
- Be prepared to award zero marks if the learner's response has no creditworthy material.
- Do not credit irrelevant material that does not answer the question, no matter how impressive the response might be.
- The marks awarded for each response should be clearly and legibly recorded in the grid on the front of the question paper.
- If you are in any doubt about the application of the mark scheme, you must consult with your Team Leader or the Chief Examiner.

Guidelines for using extended response marking grids

Extended response marking grids have been designed to award a learner's response holistically and should follow a best-fit approach. The grids are broken down into levels, with each level having an associated descriptor indicating the performance at that level. You should determine the level before determining the mark.

When determining a level, you should use a bottom up approach. If the response meets all the descriptors in the lowest level, you should move to the next one, and so on, until the response matches the level descriptor. Remember to look at the overall quality of the response and reward learners positively, rather than focussing on small omissions. If the response covers aspects at different levels, you should use a best-fit approach at this stage, and use the available marks within the level to credit the response appropriately.

When determining a mark, your decision should be based on the quality of the response in relation to the descriptors. You must also consider the relative weightings of the assessment objectives, so as not to over/under credit a response. Standardisation materials, marked by the Chief Examiner, will help you with determining a mark. You will be able to use exemplar learner responses to compare to live responses, to decide if it is the same, better or worse.

You are reminded that the indicative content provided under the marking grid is there as a guide, and therefore you must credit any other suitable responses a learner may produce. It is not a requirement either, that learners must cover all of the indicative content to be awarded full marks.

Assessment objectives

This unit requires learners to:

AO1	Recall of knowledge and understanding
AO2	Application of knowledge and understanding
AO3	Analysis to demonstrate knowledge of concepts and/or theories

The weightings of each assessment objective can be found in the qualification specification.

Qu	Mark scheme	Total marks

Section A **Total for this section: 20 marks**

1 (a)	**Height is used to calculate an individual's Body Mass Index (BMI).** **What** other **measurement is used to calculate BMI?** Award **one (1)** mark for: • weight (1).	**1** **AO1=1**

1 (b)	**Biological sex, hormones and age can affect an individual's Body Mass Index (BMI).** **Identify** three (3) other **factors that can affect BMI** and **describe how** one (1) **of the factors you have identified can affect BMI.** Award **one (1)** mark for each factor identified and up to **three (3)** marks for an appropriate description: • Diet (1) – a high calorie diet may make an individual put on weight, increasing their BMI (1) – a high fat diet may make an individual put on weight, increasing their BMI (1) – a low calorie diet may make an individual lose weight, decreasing their BMI (1) – a healthy diet can encourage bone growth in children which may affect their height, which will affect their BMI (1). • Levels of activity (1) – an increase in cardiovascular exercise can reduce weight, which will decrease BMI (1) – a lack of exercise can contribute to weight gain, which will increase BMI (1) – muscle-building exercises can increase weight, which will increase BMI (1) • Ill health (1) – ill health can reduce physical activity, which may affect body weight and BMI (1) – ill health may affect diet, which could affect body weight and BMI (1) – ill health can affect bone density which may affect both weight and health, affecting BMI (1). • Medication (1) – statins affect body fat and can therefore lower BMI (1) – beta blockers may cause weight gain which can affect BMI (1)	**6** **AO1=3** **AO3=3**

	– paracetamol may cause a loss of appetite which could lead to weight loss and therefore reduce BMI (1) – salbutamol (reliever) inhalers may cause weight loss whereas steroidal (preventer) inhalers may cause weight gain, which could affect BMI (1) – steroids may cause weight gain, which may affect BMI (1). Accept other appropriate responses.	

1 (c) **Explain the process of glucoregulation**.

6
AO2=3
AO3=3

Level	Mark	Description
3	**5–6**	Application of knowledge is appropriate and accurate and shows clear understanding of the process of glucoregulation. Analysis to demonstrate understanding of the process of glucoregulation is detailed and highly effective, with clearly reasoned consequences. Clear links are made.
2	**3–4**	Application of knowledge is mostly appropriate, showing some clear understanding of the process of glucoregulation. There may be a few errors. Analysis to demonstrate understanding of the process of glucoregulation is effective and mostly relevant, with simplistic consequences. Some clear links are made.
1	**1–2**	Application of knowledge is limited and may show a lack of understanding of the process of glucoregulation. There may be a number of errors. Analysis to demonstrate understanding of the process of glucoregulation lacks detail and may have limited effectiveness and relevance. Links may be made but are often inappropriate.
	0	No creditworthy material.

Indicative content

AO2

- Glucoregulation is the maintenance of steady levels of glucose in the bloodstream.
- The hypothalamus and pituitary gland are responsible for blood glucoregulation.
- Hormones are released by the pancreas. These hormones are insulin and glucagon.
- This mechanism is closely related to the dietary intake of nutrients.

AO3

	• The hypothalamus monitors blood glucose levels and detects changes. This process is called negative feedback. • The hypothalamus then instructs the pituitary gland to release hormones to instruct the pancreas. • Insulin works to reduce the amount of glucose in the blood by promoting the absorption of glucose into the liver, converting glucose into glycogen. • Glucagon works to raise the concentration of glucose in the blood by causing the liver to convert glycogen into glucose and release it into the bloodstream. Accept other appropriate responses.	

1 (d)	**Identify the primary organ involved in glucoregulation** and **explain the structure of this organ.** Award **one (1)** mark for correct identification and up to **three (3)** marks for an appropriate explanation: • Pancreas (1) A long flat gland (1). The head of the pancreas is connected to the duodenum by connective tissue (1). It is composed of "berry-like" clusters of cells (1). These cells are connected by ducts (1). Insulin is created in the islets of Langerhans (1). Accept other appropriate responses.	**4** **AO1=1** **AO3=3**

1 (e)	**The kidney is a component of the excretory (urinary) system. Identify the** three (3) other **components of the excretory (urinary) system.** Award **one (1)** mark for each correct identification: • ureter (1) • bladder (1) • urethra (1).	**3** **AO1=3**

Section B **Total for this section: 20 marks**

2 (a)	**Which of the following is the name given to a bacterium, virus, or other microorganism that can cause disease?** **A Antibody** **B Antigen** **C Lymph** **D Pathogen** Award **one (1)** mark for:	**1** **AO1=1**

	• D - Pathogen (1).	

2 (b) **Discuss the likely effects of Human Immunodeficiency Virus (HIV) on Amelia's wellbeing.**

12
AO1=2
AO2=5
AO3=5

Level	Mark	Description
3	**9–12**	A wide range of relevant knowledge and understanding of the impact of HIV on the wellbeing of Amelia is shown, which is accurate and detailed. Application of knowledge is appropriate and accurate and shows clear understanding of the impact of HIV on the wellbeing of Amelia. Analysis to demonstrate understanding of the impact HIV has on the wellbeing of Amelia is detailed and highly effective, with reasoned judgements made. Clear links are made.
2	**5–8**	A wide range of relevant knowledge and understanding of the impact of HIV on the wellbeing of Amelia is shown. There may be a few errors. Application of knowledge is mostly appropriate, showing some clear understanding of the impact HIV has on the wellbeing of Amelia. There may be a few errors. Analysis to demonstrate understanding of the impact of HIV on the wellbeing of Amelia is effective and mostly relevant with simplistic judgments made. Some clear links are made.
1	**1–4**	A limited range of relevant knowledge and understanding of the impact of HIV on the wellbeing of Amelia is shown but is often fragmented. Application of knowledge is limited and may show a lack of understanding of the impact of HIV on the wellbeing of Amelia. There may be a number of errors. Analysis to demonstrate understanding of the impact of HIV on the wellbeing of Amelia lacks detail and may have limited effectiveness and relevance. Links may be made but are often inappropriate.
	0	No relevant material.

Indicative content

Answers may take a holistic approach or focus on the individual physical, cognitive, emotional and social aspects of Amelia's wellbeing.

Physical

AO1

- Many of the physical effects on Amelia are related to the failure of the immune system in HIV.

AO2

- Initial infection can give Amelia flu-like symptoms, such as fever, chills, headache, sore throat and an increased temperature.
- Other initial symptoms can include joint pain, rashes and mouth ulcers.

AO3

- As the infection progresses, she may experience fatigue, shortness of breath or weight loss.
- Kaposi sarcoma is a cancer of the blood vessel walls and has increasing prevalence amongst HIV-positive individuals such as Amelia.

Cognitive

AO1

- HIV-associated cognitive disorder (sometimes called HIV-associated neurocognitive disorder or HAND).

AO2

- This occurs when HIV itself (or the response of the immune system to HIV) directly affects the brain and causes cognitive disorders.
- Changes to Amelia's lifestyle can reduce her risk of cognitive impairment.

AO3

- Generally, things which are recommended in order to protect the health of her heart will also protect her cognitive abilities.
- It's also important she continues to be socially connected and mentally engaged.

Emotional

AO1

- Amelia could suffer anxiety and depression.

AO2

- HIV can lead to life-limiting illnesses such as AIDS. This can affect Amelia's view of the world, resulting in anxiety and depression.

	• Amelia may feel angry about her situation, either at herself or at others. **AO3** • Amelia may feel stressed as a result of the above emotions and this may affect her feelings of being able to cope. • Amelia may be reluctant to engage in personal relationships or suffer the loss of relationships which may make her lonely. <u>Social</u> **AO1** • Amelia may experience stigma or discrimination due to her HIV-positive status. **AO2** • This could result in her losing friends and acquaintances and therefore having fewer opportunities to socialise. • Amelia may be reluctant to engage in personal relationships. **AO3** • Amelia may suffer the loss of relationships which may make her lonely. • Amelia may make new friends in a supportive HIV community. Accept other appropriate responses.	

2 (c)	**Describe the location** and **structure of the thymus.** Award up to **three (3)** marks for a correct description: • the thymus is located in the upper front part of the chest (1) • it is made up of two lobes (1) • each lobe has a central medulla and an outer cortex (1) and is surrounded by a capsule (1) • the thymus is made up of immature T cells (1) and epithelial cells (1).	**3** **AO2=3**

2 (d)	**B cells and phagocytes are types of lymphocytes.** **Identify the** other **type of lymphocyte** and **explain the function of this lymphocyte.** Award **one (1)** mark for correct identification and up to **three (3)** marks for an accurate explanation: • T cells (1) - cytotoxic T cells kill their target cells (1) primarily by releasing cytotoxic granules into the cell to be killed (1). T helper cells activate other immune cells (1) and help B cells to produce antibodies (1). Memory T cells expand to effector T cells upon re-exposure to the antigen (1) providing the immune system with	**4** **AO1=1** **AO3=3**

	memory against previously encountered antigens (1). Accept other suitable responses.	

Section C **Total for this section: 20 marks**

3 (a) **Discuss the likely effects of eczema on Jacob's wellbeing.** **9 AO1=3 AO2=3 AO3=3**

Level	Mark	Description
3	**7–9**	A range of relevant knowledge and understanding of how eczema may impact on the wellbeing of Jacob is shown, which is accurate and detailed. Application of knowledge is appropriate and accurate and shows clear understanding of how eczema may impact on the wellbeing of Jacob. Analysis to demonstrate understanding of how eczema may impact on the wellbeing of Jacob is detailed and highly effective, with reasoned judgements made. Clear links are made.
2	**4–6**	A range of relevant knowledge and understanding of how eczema may impact on the wellbeing of Jacob is shown, but may be lacking in sufficient detail, with a few errors. Application of knowledge is mostly appropriate, showing some clear understanding of how eczema may impact on the wellbeing of Jacob. There may be a few errors. Analysis to demonstrate understanding of how eczema may impact on the wellbeing of Jacob is effective and mostly relevant with simplistic judgments made. Some clear links are made.
1	**1–3**	A range of relevant knowledge and understanding of how eczema may impact on the wellbeing of Jacob but is often fragmented. Application of knowledge is limited and may show a lack of understanding of how eczema may impact on the wellbeing of Jacob. There may be a number of errors. Analysis to demonstrate understanding of how eczema may impact on the wellbeing of Jacob lacks detail and may have limited effectiveness and relevance. Links may be made but are often inappropriate.
	0	No relevant material.

Indicative content

Answers may take a holistic approach or focus on the individual physical, cognitive, emotional and social aspects of Jacob's wellbeing:

Physical

AO1

- Jacob may experience inflamed, itchy rashes on any of the skin surfaces.

AO2

- These may be frequently complicated by skin breakdown and bacterial, viral and fungal infections.

AO3

- Jacob's eczema can be associated with other allergic conditions, including asthma, food allergies and rhinitis.
- This can be extremely uncomfortable and, at times, painful. As a consequence, this could interfere with Jacob's sleep.

Cognitive

AO1

- Jacob may find it difficult to concentrate due to the itchiness and pain.

AO2

- This could affect his performance of daily activities, including school, sports activities, work.

Emotional

AO1

- Jacob could experience considerable emotional distress because of people's response to this illness.

AO3

- Depression and anxiety are more common in individuals with eczema.

Social

AO1

- Jacob could experience considerable discrimination and social isolation.

AO2

- The pain and stigma could reduce the quality of Jacob's social interactions and friendship groups.

	AO3 • In studies, individuals with eczema reported more negative impact on quality of life than those with insulin-dependent diabetes. Accept other suitable responses.	

3 (b)	**Identify the** three (3) **primary layers of the skin.** Award **one (1)** mark for each correct answer: • epidermis (1) • dermis (1) • subcutaneous (hypodermis) (1).	**3** **AO1=3**

3 (c)	**Identify** three (3) **structural components found in the middle layer of skin** and **briefly explain** one (1) **of these structural components.** Award **one (1)** mark for each correct identification up to a maximum of **three (3)** marks: • hair follicles (1) • sweat glands (1) • sebaceous glands (1) • lymphatic vessels (1) • nerves (1) • blood vessels (1). Award **one (1)** further mark for a brief explanation: • hair follicles – regulates hair growth (1). Different follicles around the body produce different types of hair (1) • sweat glands– tubular structures that produce sweat (1) to help cool the body (1) • sebaceous glands– opens into the hair follicle (1) to produce an oily substance (1) • lymphatic vessels thin-walled vessels (1) that carry lymph (1) • nerves - components of the nervous system (1) that transmit signals to and from the brain (1) • blood vessels - components of the circulatory system (1) that carry blood around the body (1). Accept other suitable responses.	**4** **AO1=3** **AO3=1**

3 (d)	**Identify** three (3) **functions of the skin** and **briefly describe** one (1) **of these functions.** Award **one (1)** mark for each correct identification up to a maximum of **three (3)** marks: • protection (1) • temperature regulation (1) • sensation (1) • excretion (1) • vitamin D synthesis (1). Award **one (1)** further mark for a brief description: • protection – the skin is waterproof (1) and thick to protect against cuts (1) • temperature regulation – skin produces sweat to cool down (1) and hair lies flat/becomes erect to assist with thermoregulation (1) • sensation – skin contains sensory nerves (1) these can detect heat, touch, pressure, pain (1) • excretion – sweat is produced (1) as is sebum (1) • vitamin D synthesis – skin utilises sunlight (1) to produce vitamin D (1). Accept other suitable responses.	**4** **AO1=3** **AO2=1**

Section D **Total for this section: 20 marks**

4 (a) **Discuss the structure and function of long bones within the skeletal system.**

6
AO2=3
AO3=3

Level	Mark	Description
3	**5–6**	Application of knowledge is appropriate and accurate and shows clear understanding of long bones within the skeletal system. Analysis to demonstrate understanding of long bones within the skeletal system is detailed and highly effective, with clearly reasoned consequences. Clear links are made.
2	**3–4**	Application of knowledge is mostly appropriate, showing some clear understanding of long bones within the skeletal system. There may be a few errors. Analysis to demonstrate understanding of the long bones within the skeletal system is effective and mostly relevant, with simplistic consequences. Some clear links are made.
1	**1–2**	Application of knowledge is limited and may show a lack of understanding of long bones within the skeletal system. There may be a number of errors. Analysis to demonstrate understanding of long bones within the skeletal system lacks detail and may have limited effectiveness and relevance. Links may be made but are often inappropriate.
	0	No creditworthy material.

Indicative content
AO2

- The long bones are those that are longer than they are wide.
- Long bones are subjected to most of the load during daily activities and they are crucial for skeletal mobility.
- The outer shell of the long bone is made of compact bone and this is covered by a membrane of connective tissue.
- Beneath the compact bone layer is a layer of spongy cancellous bone.
- Long bones are mostly located in the appendicular skeleton and include bones in the lower limbs and bones in the upper limbs.

	AO3 • Long bones have an inner core of bone marrow, made up of yellow marrow in the adult and red marrow in the child. This is stored in the medullary cavity. • Long bones have a periosteum which is a membrane that covers the outer surface. • Long bones have an epiphysial line at the end of the bone which is only found in adults. • The epiphysial line is covered in cartilage. • Long bones function to support the weight of the body and facilitate movement. Accept other suitable responses.	

4 (b)	**Which structure is part of the axial skeleton?** **A Femur** **B Humerus** **C Scapula** **D Skull** Award **one (1)** mark for the correct answer: • D – Skull (1).	**1** **AO1=1**

4 (c)	**Storage of calcium and production of blood cells are two functions of the skeletal system.** **Identify** three (3) other **functions of the skeletal system** and **explain** one (1) **of the functions that you identified.** Award **one (1)** mark for each correct identification (up to a maximum of **three (3)** marks) and up to **two (2)** marks for an accurate explanation: • support (1) – bones are hard rigid structures (1) they provide a firm base upon which muscles and connective tissues are attached (1) • protection (1) – bones are hard and can protect organs from external damage (1) the skull protects the brain (1). The ribs protect the heart and lungs (1) • attachment of muscles (1) – muscles are attached to bones via tendons (1) this allows for movement of the body using joints (1). Accept other suitable responses.	**5** **AO1=3** **AO3=2**

4 (d)	**Fibrous and cartilaginous are two types of joint.** **Identify** and **describe the** other **type of joint.**	**3** **AO1=1** **AO2=2**

	Award **one (1)** mark for correct identification and up to **two (2)** marks for an accurate description: • synovial (1) – joins bones with a fibrous capsule (1) that contains synovial fluid (1) which reduces friction within the joint (1) to facilitate movement (1). Synovial joints are freely movable and allow lots of movement (1). Accept other suitable responses.	

4 (e)	**Identify the** three (3) **types of muscle** and **describe** one (1) **of these types of muscle.** Award **one (1)** mark for each correct identification (up to a maximum of **three (3)** marks) and up to **two (2)** marks for an accurate description: • smooth (1) – this is an involuntary muscle (1) that is non-striated (1). It is found in the walls of hollow organs, including the stomach, intestines, urinary bladder and uterus (1) • cardiac (1) - this is an involuntary muscle (1) that is striated (1) this muscle constitutes the main tissue of the walls of the heart (1) • skeletal (1) - this is a voluntary muscle (1) that is striated (1). These muscles are predominantly involved in movement of the body (1). Accept other suitable responses.	**5** **AO1=3** **AO2=2**

Assessment Objective Grid

Question	AO1	AO2	AO3	Total
1(a)	1			1
1(b)	3		3	6
1(c)		3	3	6
1(d)	1		3	4
1(e)	3			3
				20
2(a)	1			1
2(b)	2	5	5	12
2(c)		3		3
2(d)	1		3	4
				20
3(a)	3	3	3	9
3(b)	3			3
3(c)	3		1	4
3(d)	3	1		4
				20
4(a)		3	3	6
4(b)	1			1
4(c)	3		2	5
4(d)	1	2		3
4(e)	3	2		5
				20
Total	**32**	**22**	**26**	**80**