



**ADVANCED SUBSIDIARY (AS)  
General Certificate of Education  
2024**

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## **Health and Social Care**

**Assessment Unit AS 7**

*assessing*

**Understanding the Physiology of Health and Illness**

**[SHC71]**

**TUESDAY 4 JUNE, MORNING**

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**MARK  
SCHEME**

## General Marking Instructions

### *Introduction*

The main purpose of a mark scheme is to ensure that examinations are marked accurately, consistently and fairly. The mark scheme provides examiners with an indication of the nature and range of candidates' responses likely to be worthy of credit. It also sets out the criteria which they should apply in allocating marks to candidates' responses.

### *Assessment objectives*

Below are the assessment objectives for **GCE Health and Social Care**.

Candidates should be able to:

- AO1** Demonstrate knowledge and understanding of the specified content.
- AO2** Apply knowledge, understanding and skills to a variety of health, social care and early years contexts.
- AO3** Investigate, analyse, and evaluate acquired knowledge and understanding, present arguments, make reasoned judgements and draw conclusions.

### *Quality of candidates' responses*

In marking the examination papers, examiners should be looking for a quality of response reflecting the level of maturity which may reasonably be expected of a 17 or 18-year-old which is the age at which the majority of candidates sit their GCE examinations.

### *Flexibility in marking*

Mark schemes are not intended to be totally prescriptive. No mark scheme can cover all the responses which candidates may produce. In the event of unanticipated answers, examiners are expected to use their professional judgement to assess the validity of answers. If an answer is particularly problematic, then examiners should seek the guidance of the Supervising Examiner.

### *Positive marking*

Examiners are encouraged to be positive in their marking, giving appropriate credit for what candidates know, understand and can do rather than penalising candidates for errors or omissions. Examiners should make use of the whole of the available mark range for any particular question and be prepared to award full marks for a response which is as good as might reasonably be expected of a 17 or 18-year-old GCE candidate.

### *Awarding zero marks*

Marks should only be awarded for valid responses and no marks should be awarded for an answer which is completely incorrect or inappropriate.

### *Types of mark schemes*

Mark schemes for tasks or questions which require candidates to respond in extended written form are marked on the basis of levels of response which take account of the quality of written communication. Other questions which require only short answers are marked on a point for point basis with marks awarded for each valid piece of information provided.

### *Levels of response*

In deciding which level of response to award, examiners should look for the ‘best fit’ bearing in mind that weakness in one area may be compensated for by strength in another. In deciding which mark within a particular level to award to any response, examiners are expected to use their professional judgement.

The following guidance is provided to assist examiners.

- **Threshold performance:** Response which just merits inclusion in the level and should be awarded a mark at or near the bottom of the range.
- **Intermediate performance:** Response which clearly merits inclusion in the level and should be awarded a mark at or near the middle of the range.
- **High performance:** Response which fully satisfies the level description and should be awarded a mark at or near the top of the range.

### *Quality of written communication*

Quality of written communication is taken into account in assessing candidates’ responses to all tasks and questions that require them to respond in extended written form. These tasks and questions are marked on the basis of levels of response. The description for each level of response includes reference to the quality of written communication.

For conciseness, quality of written communication is distinguished within levels of response as follows:

Level 1: Quality of written communication is basic.

Level 2: Quality of written communication is adequate.

Level 3: Quality of written communication is competent.

Level 4: Quality of written communication is highly competent.

In interpreting these level descriptions, examiners should refer to the more detailed guidance provided below:

**Level 1 (Basic):** The candidate makes only a limited attempt to select and use an appropriate form and style of writing. The organisation of material may lack clarity and coherence. There is little use of specialist vocabulary. Presentation, spelling, punctuation and grammar may be such that intended meaning is not clear.

**Level 2 (Adequate):** The candidate makes a reasonable attempt to select and use an appropriate form and style of writing. Relevant material is organised with some clarity and coherence. There is some use of appropriate specialist vocabulary. Presentation, spelling, punctuation and grammar are sufficiently competent to make meaning evident.

**Level 3 (Competent):** The candidate successfully selects and uses the most appropriate form and style of writing. Relevant material is organised with a high degree of clarity and coherence. There is extensive and accurate use of appropriate specialist vocabulary. Presentation, spelling, punctuation and grammar are of a high standard and ensure that meaning is clear.

**Level 4 (Highly competent):** The candidate successfully selects and uses the most appropriate form and style of writing. Relevant material is extremely well organised with the highest degree of clarity and coherence. There is extensive and accurate use of appropriate specialist vocabulary. Presentation, spelling, punctuation and grammar are of the highest standard and ensure that meaning is absolutely clear.

1 (a) (i) Write down **one** function of each of the following organelles. (AO1)

Golgi apparatus

- processes proteins received from the ER and sorts them for transport
- synthesises glycolipids and sphingomyelin

Mitochondrion

- generates chemical energy needed to power the cell's biochemical reactions

Ribosome

- the site of protein synthesis in the cell

Lysosome

- breaks down excess or worn-out cell parts
- destroys invading viruses and bacteria

(4 × [1])

[4]

(ii) Complete the table below by identifying the examples of tissues and their function as indicated. (AO1, AO2)

Tissue	Example of tissue	Function
connective	<b>red blood cells/blood</b> [1]	carrying oxygen to every cell in the body
epithelial	lining of digestive tract	<b>protection or absorption</b> [1]
muscle	skeletal	<b>movement or maintain posture and position</b> [1]
nervous	<b>motor neurone</b> [1]	carrying impulse to effector

(4 × [1])

[4]

(iii) Explain the term organ. (AO1, AO2)

**Examples of suitable points to be included in explanation:**

A group of tissues, working together to perform a common function, e.g. the heart

All other valid responses will be given credit

[1] basic explanation, [2] competent explanation

(1 × [2])

[2]

- (b) (i) Complete the paragraph below to outline the organisation of the nervous system. (AO1)

The human nervous system consists of a number of subsystems with different functions.

The central nervous system consists of the spinal cord and **brain** [1].

The autonomic nervous system consists of the **parasympathetic** nervous system [1], which controls the rest and digest response and the sympathetic nervous system which controls the **fight or flight** response [1].

There is also voluntary control of the output to skeletal muscle and **involuntary** control [1] of smooth muscle and glands.

(4 × [1]) [4]

- (ii) Describe the role of the pituitary gland, which is found at the base of the brain. (AO1, AO2)

**Examples of suitable points to be included in the description:**

- it controls the other glands – the pituitary gland is considered to be the master gland of the endocrine system
- it releases several important endocrine hormones and controls many other endocrine system glands
- it monitors body functions
- it sends hormone messages to organs and glands to regulate, e.g. growth, metabolism, reproduction, stress response, water and salt balance.

All other valid responses will be given credit

[1] basic description, [2] adequate description, [3] competent description  
(1 × [3]) [3]

- (c) (i) Write down the names of the three types of neurone, A, B and C. (AO1)

- A sensory neurone  
B association neurone or relay neurone  
C motor neurone

(3 × [1]) [3]

- (ii) Explain why the reflex arc is needed by the nervous system. (AO1, AO2)

**Examples of suitable responses to be included in the explanation:**

- it is needed for very fast responses which will occur without conscious thought, e.g. putting a hand on a hot plate, so prevents harm or injury to the body
- it is needed for automatic responses, for example, blinking or sneezing

All other valid responses will be given credit

[1] basic explanation, [2] competent explanation

(1 × [2])

[2]

- (iii) The diagram of the reflex arc shows a cross section of the spinal cord. Explain how damage to the spinal cord can cause paraplegia. (AO1, AO2)

**Examples of suitable points to be included in explanation:**

Damage to the thoracic spine (T2 to T12) can cause loss of function in the lower limbs (the legs). The upper limbs (the arms) will still retain function

All other valid responses will be given credit

[1] basic explanation, [2] competent explanation

(1 × [2])

[2]

- (iv) Assess how paraplegia may impact on Jamil's education, leisure activities and relationships. (AO1, AO2, AO3)

**Examples of suitable points to be included in assessment:**

**Education**

- Jamil may be off school for a period of time whilst he has initial therapy and treatment. As a result, there may be gaps in his understanding which he struggles with when he does return to school or he may decide to repeat a year – this may make Jamil's return to school challenging
- Jamil could become disaffected and may never attain as was predicted before the accident
- Jamil may get home tuition whilst he is unable to attend school and so keep up with the key aspects of his studies which would be essential as he approaches GCSE
- Jamil can successfully reintegrate into school as he has no cognitive impairment and he may be able to maintain his studies
- Jamil may reconsider some of his GCSE choices to allow time for his physical rehabilitation

**Leisure activities**

- Jamil will no longer be able to play football as he has lost all the movement in his legs. He may be able to play wheelchair football especially if this is something the school or his club encourages. He may consider a different sport which he can play or become interested in going to the gym or swimming as this may be familiar to him through rehabilitation

- he may take up other leisure activities, e.g. photography
- Jamil may not want to do any sport as he can no longer play football and may struggle to do other non-sport leisure activities as he has little experience of them
- he may continue with some of the leisure activities he previously enjoyed, e.g. going to the cinema with friends

### Relationships

- Jamil's footballing friends may become estranged from him as he no longer joins in their games. On the other hand, they may find a role for him, e.g. team manager which means that he is involved and maintains his friendship group
- Jamil may struggle to reintegrate into his friendship group at school as he has been absent for so long or may be in a different year
- teachers may be supportive which would strengthen his relationships with them
- Jamil may become more dependent on his family, especially his parents, as he will have a need for support to carry out some daily living tasks and for transport. They may also be closer to him because of the time spent at the hospital supporting him
- Jamil may feel embarrassed to get help from his family and this could cause him to become more distant. His parents may be overprotective which could also upset the family dynamic putting stress on his relationship with them
- the time spent away from his family during his treatment may mean that his relationship with his siblings has become more distant or alternatively his relationship with his siblings may strengthen as they support him

All other valid responses will be given credit

[0] is awarded for a response not worthy of credit

### Level 1 ([1]–[4])

Overall impression: basic

- basic knowledge and understanding of how paraplegia may impact on Jamil's education, leisure activities and relationships
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- displays a limited ability to assess how paraplegia may impact on Jamil's education, leisure activities and relationships
- quality of written communication is basic. The candidate makes only a limited attempt to select and use an appropriate form and style of writing. The organisation of material may lack clarity and coherence. There is little use of specialist vocabulary. Presentation, spelling, punctuation and grammar may be such that intended meaning is not clear.

### Level 2 ([5]–[8])

Overall impression: adequate

- adequate knowledge and understanding of how paraplegia may impact on Jamil's education, leisure activities and relationships
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question
- displays an adequate ability to assess how paraplegia may impact on Jamil's education, leisure activities and relationships

- to achieve at this level at least two aspects must be addressed
- quality of written communication is adequate. The candidate makes a reasonable attempt to select and use an appropriate form and style of writing. Relevant material is organised with some clarity and coherence. There is some use of appropriate specialist vocabulary. Presentation, spelling, punctuation and grammar are sufficiently competent to make meaning evident.

**Level 3 ([9]–[12])**

Overall impression: competent

- competent knowledge and understanding of how paraplegia may impact on Jamil’s work, leisure activities and relationships
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question
- displays a competent ability to assess how paraplegia may impact on Jamil’s work, leisure activities and relationships
- to achieve at this level all three aspects must be addressed
- quality of written communication is competent. The candidate successfully selects and uses the most appropriate form and style of writing. Relevant material is organised with a high degree of clarity and coherence. There is extensive and accurate use of appropriate specialist vocabulary. Presentation, spelling, punctuation and grammar are of a high standard and ensure that the meaning is clear.

[12]

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MARKS

2 (a) (i) Explain the function of each of the following parts. (AO1, AO2)

Bladder

This is a muscular sac which expands to store the urine produced until there is a sufficient quantity to release out of the body. A semi-voluntary sphincter controls its opening.

Ureter

This is a tube which leads from the kidney to the bladder and allows urine to pass from collecting ducts in the kidneys to the bladder.

Renal vein

The renal vein carries filtered/cleansed blood from the kidney back to the heart.

(3 × [2]) [6]

(ii) One role of this system is osmoregulation. Write down the other main role of the urinary system. (AO1)

excretion

(1 × [1]) [1]

(iii) Describe the impact of dehydration on the body. (AO1, AO2)

**Examples of suitable points to be included in the description:**

- the effects depend on the severity of the problem
- early effects include thirst and urine that is dark in colour, potentially with a strong smell
- if left untreated, headaches and light-headedness can ensue. There can also be lethargy, low stamina and dry lips and mouth
- prolonged dehydration leads to severe effects including disorientation, confusion, dizziness, loss of consciousness or a seizure
- the individual may become constipated, have kidney stones or experience muscle damage

All other valid responses will be given credit

[1] basic description, [2] adequate description, [3] competent description  
(1 × [3]) [3]

- (b) Using the diagram and your knowledge of the nephron, discuss how filtration, reabsorption and osmoregulation occur in the kidney, including the role of the anti-diuretic hormone (ADH). (AO1, AO2, AO3)

**Examples of suitable points to be included in the discussion:**

**Filtration**

- blood entering the kidney is put under pressure due to the difference in diameter of the afferent and efferent arterioles feeding into the glomerulus
- this pressure forces small substances like glucose, salt, urea and water out of the blood vessels and into the Bowman's capsule; this is called ultra-filtration
- substances like blood cells and proteins are not filtered out of the blood as they are too large

**Reabsorption**

- 80% of reabsorption will occur along the proximal convoluted tubule which is only one cell thick for a short diffusion pathway
- many of the substances that are filtered are needed for the body to function
- glucose is reabsorbed in the proximal convoluted tubule by diffusion and active transport as it is needed for respiration
- some salt and water are also reabsorbed in the proximal convoluted tubule and the rest in the loop of Henle and distal convoluted tubule. None of the urea is reabsorbed

**Osmoregulation**

- the amount of water secreted in urine depends on the amount of water in the blood
- osmoregulation in the collecting duct is controlled by ADH
- if there is too little water more ADH is released from the pituitary and travels via the blood to the kidney, where it causes the collecting duct to become more permeable
- more water is reabsorbed, and a smaller volume of more concentrated urine is produced
- if there is excess water in the blood, less ADH is released from the pituitary, so the collecting duct becomes less permeable
- less water is reabsorbed, and a larger volume of less concentrated urine is produced

All other valid responses will be given credit

[0] is awarded for a response not worthy of credit.

**Level 1 ([1]–[4])**

Overall impression: basic

- limited knowledge and understanding of how filtration, reabsorption and osmoregulation occur in the kidney, including the role of the hormone ADH
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- displays a limited ability to discuss filtration, reabsorption and osmoregulation with little detail of how the nephron structure aids the process
- quality of written communication is basic. The candidate makes only

a limited attempt to select and use an appropriate form and style of writing. The organisation of material may lack clarity and coherence. There is little use of specialist vocabulary. Presentation, spelling, punctuation and grammar may be such that intended meaning is not clear.

### **Level 2 ([5]–[8])**

Overall impression: adequate

- adequate knowledge and understanding of how filtration, reabsorption and osmoregulation occur in the kidney, including the role of the hormone ADH
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question
- displays an adequate ability to discuss filtration, reabsorption and osmoregulation with some detail on how the structure of the nephron aids the process including detail of some of the substances involved in the processes
- in order to achieve at this level at least two of the processes must be addressed
- quality of written communication is adequate. The candidate makes a reasonable attempt to select and use an appropriate form and style of writing. Relevant material is organised with some clarity and coherence. There is some use of appropriate specialist vocabulary. Presentation, spelling, punctuation and grammar are sufficiently competent to make meaning evident.

### **Level 3 ([9]–[12])**

Overall impression: competent

- competent knowledge and understanding of how filtration, reabsorption and osmoregulation occur in the kidney, including the role of the hormone ADH
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question
- displays a competent ability to discuss filtration, reabsorption and osmoregulation with detail on the structure of the nephron and how it aids each process including detail of all the substances involved in the processes including ADH
- in order to achieve at this level all three processes must be addressed
- quality of written communication is competent. The candidate successfully selects and uses the most appropriate form and style of writing. Relevant material is organised with a high degree of clarity and coherence. There is extensive and accurate use of appropriate specialist vocabulary. Presentation, spelling, punctuation and grammar are of a high standard and ensure that the meaning is clear.

[12]

- (c) (i) Complete the table below to identify the endocrine organ which produces each of the hormones indicated. (AO1)

Endocrine organ	Hormone
<b>thyroid gland</b> [1]	thyroxine
<b>adrenal gland</b> [1]	adrenaline
<b>ovaries</b> [1]	oestrogen

(3 × [1])

[3]

- (ii) Outline how blood glucose levels are regulated by the hormones insulin and glucagon in the pancreas. (AO1, AO2)

**Examples of suitable points to be outlined:**

**Insulin**

Insulin is produced by beta cells and released into the pancreas when it detects that the blood's glucose level is too high, e.g. after eating. Insulin converts the excess glucose in the blood into glycogen so that it can be stored in the liver until it is needed for energy release.

**Glucagon**

Glucagon is produced by alpha cells and released into the pancreas when it detects that the blood glucose levels are too low, e.g. after exercise. It stimulates the liver to break down glycogen into glucose which is released into the bloodstream to provide cells with energy.

All other valid responses will be given credit.

(2 × [3])

[6]

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- 3 (a) (i) Identify and explain the functions of the parts labelled A, B and C. (AO1, AO2)

A: small intestine/ileum

Functions:

- digestion of food is completed here
- absorption of nutrients
- absorption of water from food

B: mouth

Functions:

- teeth chew up food into smaller pieces
- food mixes with saliva to moisten it
- tongue forms bolus/pellet which aids swallowing
- saliva has enzymes which start digestion

C: large intestine/colon

Functions:

- reabsorption of salts and fluids/water needed by the body after digestion
- mixing of contents with mucus for lubrication

All other valid responses will be given credit.

(3 × [1])

[3]

(3 × [2])

[6]

- (ii) Explain the function of bile in digestion. (AO1, AO2)

- bile emulsifies fats
- it breaks them down into fatty acids which are more easily absorbed
- it also has an alkaline pH which neutralises the chyme which comes from the stomach

[1] basic explanation, [2] competent explanation

(1 × [2])

[2]

- (iii) Discuss the processes that happen in the stomach to aid digestion. (AO1, AO2, AO3)

**Examples of suitable points to be included in discussion:**

- the stomach holds food for a number of hours. This allows the food to mix with the enzymes and other chemicals secreted by the stomach
- stomach muscles contract to knead and moisten food into a semifluid mixture called chyme which is easier to digest. The contractions ease chyme towards the duodenum
- produces hydrochloric acid which kills unwanted microorganisms/bacteria
- produces enzymes which begin to chemically break down large complex food molecules into smaller molecules suitable for digestion

All other valid responses will be given credit.

[0] is awarded for a response not worthy of credit.

**Level 1 ([1]–[2])**

Overall impression: basic

- basic knowledge and understanding of the processes that happen in the stomach to aid digestion
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- displays a limited ability to discuss the processes that happen in the stomach to aid digestion.

**Level 2 ([3]–[4])**

Overall impression: adequate

- adequate knowledge and understanding of the processes that happen in the stomach to aid digestion
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question
- displays an adequate ability to discuss the processes that happen in the stomach to aid digestion

**Level 3 ([5]–[6])**

Overall impression: competent

- competent knowledge and understanding of the processes that happen in the stomach to aid digestion
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question
- displays a competent ability to discuss the processes that happen in the stomach to aid digestion [6]

- (b) (i) Identify the bacteria that causes a stomach ulcer. (AO1)

*Helicobacter pylori* (accept *H pylori*)

(1 × [1]) [1]

- (ii) Explain **two** ways that Jenny could change her diet now that she has been diagnosed with an ulcer. (AO1, AO2)

**Examples of suitable points to be explained:**

- avoid spicy foods which contribute to acid in the digestive system and so can make an ulcer worse
- have a diet high in fibre and rich in vegetables, fruit and whole grains
- avoid fried foods as they aggravate stomach ulcers
- avoid acidic foods, e.g. citrus fruits and tomatoes
- avoid highly processed foods
- avoid caffeine as it increases acid production by speeding up gastric emptying

All other valid responses will be given credit.

[1] basic explanation, [2] competent explanation  
(2 × [2]) [4]

- (c) (i) Explain what causes chronic pancreatitis. (AO1, AO2)

**Examples of suitable points to be included in explanation:**

- permanent damage to the pancreas so that it no longer works properly
- drinking excessive amounts of alcohol over a long period of time
- several bouts of acute pancreatitis resulting in increasing damage to the pancreas
- smoking
- injury from a blow to the pancreas
- gallstones
- inheriting a faulty gene that stops the pancreas from working properly
- immune system attacking the pancreas

All other valid responses will be given credit.

[1] basic explanation, [2] competent explanation

(1 × [2])

[2]

- (ii) Assess how a diagnosis of chronic pancreatitis may impact on Kate's work and income. (AO1, AO2, AO3)

**Examples of suitable points to be included in assessment:**

**Work**

As chronic pancreatitis may be aggravated by heavy drinking, Kate might be better to find a different job which does not involve working with alcohol. If this is the only work she has ever done, she may struggle to find some other types of job. She may well have to retrain to take a job where alcohol is not served. She might find this challenging. She may have to take time off due to her pancreatitis. She may decide to work part-time rather than full-time or in the longer term she may give up work completely. If Kate gives up alcohol, she may feel better and feel motivated to find a new job with better pay and prospects.

**Income**

Kate's job is well paid as she is the manager. If she had to give it up, she might struggle to find another job as well paid. If it takes time to find another job, she may experience a drop in her income. If she leaves her job voluntarily, she will not be entitled to a full range of benefits; if she takes a part-time or different job, her income may be reduced; her income may have to come from a different source, e.g. state benefits.

All other valid responses will be given credit.

[0] is awarded for a response not worthy of credit.

**Level 1 ([1]–[3])**

Overall impression: basic

- basic knowledge and understanding of how chronic pancreatitis may impact on Kate's work and income
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- displays a limited ability to assess how chronic pancreatitis may impact on Kate's work and income

- quality of written communication is basic. The candidate makes only a limited attempt to select and use an appropriate form and style of writing. The organisation of material may lack clarity and coherence. There is little use of specialist vocabulary. Presentation, spelling, punctuation and grammar may be such that intended meaning is not clear.

**Level 2 ([4]–[6])**

Overall impression: adequate

- adequate knowledge and understanding of how chronic pancreatitis may impact on Kate’s work and income
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question
- displays a limited ability to assess how chronic pancreatitis may impact on Kate’s work and income
- candidates addressing only one impact cannot achieve more than 5 marks
- quality of written communication is adequate. The candidate makes a reasonable attempt to select and use an appropriate form and style of writing. Relevant material is organised with some clarity and coherence. There is some use of appropriate specialist vocabulary. Presentation, spelling, punctuation and grammar are sufficiently competent to make meaning evident.

**Level 3 ([7]–[9])**

Overall impression: competent

- competent knowledge and understanding of how chronic pancreatitis may impact on Kate’s work and income
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question
- displays a competent ability to assess how chronic pancreatitis may impact on Kate’s work and income
- quality of written communication is competent. The candidate successfully selects and uses the most appropriate form and style of writing. Relevant material is organised with a high degree of clarity and coherence. There is extensive and accurate use of appropriate specialist vocabulary. Presentation, spelling, punctuation and grammar are of a high standard and ensure that the meaning is clear.

[9]

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**Total**

**100**

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MARKS