



**ADVANCED SUBSIDIARY (AS)  
General Certificate of Education  
2019**

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**Health and Social Care**

**Assessment Unit AS 7**

*assessing*

**Understanding the Physiology of Health and Illness**

**[SHC71]**

**THURSDAY 30 MAY, MORNING**

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**MARK  
SCHEME**

## **General Marking Instructions**

### ***Introduction***

The main purpose of a mark schemes 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) Write down the names and **one** function of the parts labelled **A**, **B** and **C**.  
(AO1, AO2)

**A** Name: golgi  
Function: packages and modifies protein  
[1] for name; [1] for function

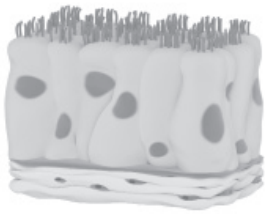
**B** Name: ribosomes  
Function: synthesise proteins  
[1] for name; [1] for function

**C** Name: mitochondria  
Function: makes energy by respiration  
[1] for name; [1] for function

(6 × [1])

[6]

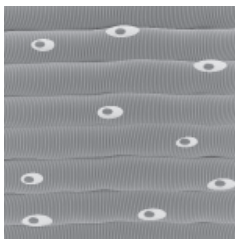
(b) The four main tissue types in the body are nervous, muscle, connective and epithelial. Identify them below. (AO1)



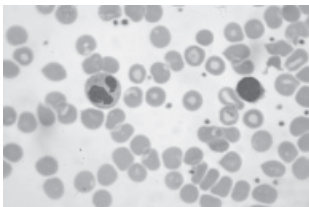
epithelial



nervous



muscle

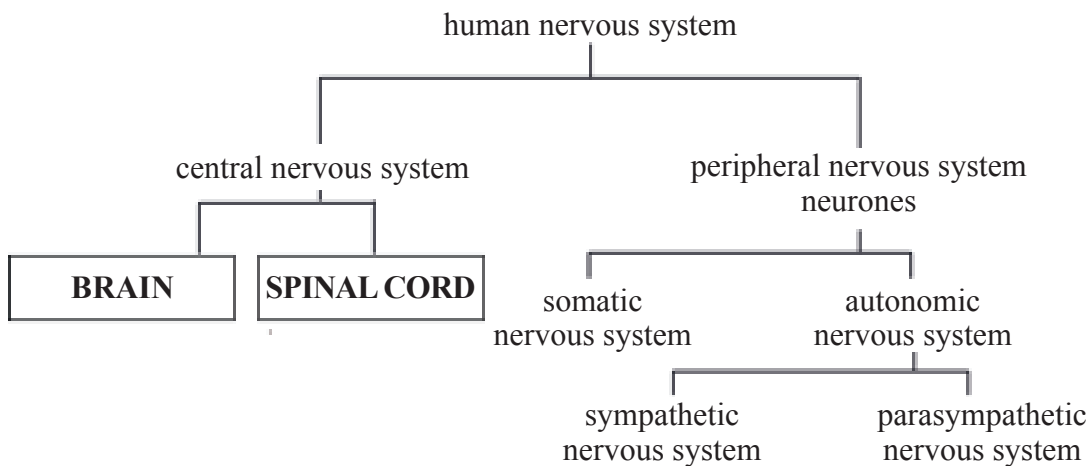


connective

(4 × [1])

[4]

- (c) (i) Complete the diagram to show the two divisions of the central nervous system. (AO1)



(2 × [1])

[2]

- (ii) Explain the function of each of the following parts of the central nervous system. (AO1, AO2)

### Hypothalamus

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

- is responsible for motivational behaviour
- detects osmolarity of the blood
- controls feelings of hunger or thirst
- helps maintain a constant body temperature
- works with the pituitary gland and acts as a link between the nervous and endocrine systems
- monitors composition of the blood

[1] basic explanation, [2] competent explanation

(1 × [2])

[2]

### Cerebellum

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

- involved in voluntary reactions
- coordinates speech
- coordinates muscle movements
- fine tunes muscle actions/sequences
- helps maintain balance and coordination.

[1] basic explanation, [2] competent explanation

(1 × [2])

[2]

### Medulla oblongata

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

- involved in involuntary reactions
- controls breathing
- regulates heart action
- controls vomiting.

[1] basic explanation, [2] competent explanation

(1 × [2])

[2]

- (d) (i) Explain what is meant by the term involuntary. (AO1, AO2)

Involuntary means that the reaction is not under the conscious control of the brain, it is a reaction that is coordinated by the spinal cord.

[1] basic explanation [2] competent explanation [2]

- (ii) Use the diagram above to discuss the mechanism that causes the arm to move away from the pin quickly. (AO1, AO2, AO3)

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

- pain receptors in the finger will detect pain (stimulus)
- the receptors will send an electrical message along the sensory neurone to the spinal cord (CNS)
- in the spinal cord the message will travel across a synapse to the association neurone
- transmission across the synapse is chemical
- the association neurone sends the electrical message to the motor neurone via another synapse
- the electrical impulse will then travel away from the CNS along the motor neurone to the effector
- the arm muscles are the effector and they will contract pulling the hand away from the pin
- this is known as a reflex reaction and does not involve the brain. It is an involuntary reaction

All other valid points 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 the mechanism of the reflex arc
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- displays a limited ability to discuss the mechanism of the reflex arc
- 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 the mechanism of the reflex arc
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question
- displays an adequate ability to discuss the mechanism of the reflex arc

- 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 organized 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 the mechanism of the reflex arc
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question
- displays a competent ability to discuss the mechanism of the reflex arc
- quality of written communication is competent. The candidate successfully selects and uses the most appropriate form and style of writing. Relevant material is organized 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]

- (e) (i) Complete the table below to identify the gland, hormone or target organ involved in the endocrine system. (AO1, AO2)

Gland	Hormone released	Target organ(s)
adrenal gland	adrenaline	heart, lungs and digestive system
pancreas	<b>insulin/glucagon</b>	liver
<b>pituitary</b>	anti-diuretic hormone (ADH)	<b>kidney</b>
pituitary	<b>FSH/LH/Oxytocin</b>	ovaries

(5 × [1])

[5]

- (ii) Choose words from the box below to complete the sentences about the endocrine and nervous systems. Words may be used once, or not at all. (AO1, AO2)

The endocrine system secretes **chemical** messengers called hormones, which are released from glands and travel to target organs via the **blood**. The nervous system transmits **electrical** messages via **neurones** to effectors (muscle or glands). The transmission in the nervous system is much **faster** than the transmission in the endocrine system. The effects of the **nervous** system are short-lived whilst the effects of the **endocrine** system are prolonged.

(7 × [1])

[7]

41

2 (a) Write down the names of the parts labelled **A**, **B** and **C**. (AO1)

**A:** oesophagus

**B:** liver

**C:** colon/large intestines

(3 × [1])

[3]

(b) Outline the role of the gall bladder. (AO1, AO2)

The gall bladder stores bile (which is produced in the liver). The gall bladder releases the bile into the ileum via the bile duct.

[1] basic outline [2] adequate outline [3] competent outline

(1 × [3])

[3]

(c) Use the diagram of a cross section of part of the ileum to help you discuss how it is adapted for the absorption of food (AO1, AO2, AO3)

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

- long length – allows time for the food to be absorbed
- good capillary network/blood supply – maintains a diffusion gradient
- epithelium is one cell thick – allows a short diffusion pathway
- villi and microvilli – increase the surface area for absorption
- lacteal – absorbs fats

All other valid points 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 how the ileum is adapted for the absorption of food.
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question.
- displays a limited ability to discuss how the ileum is adapted for the absorption of food.

**Level 2 ([3]–[4])**

Overall impression: adequate

- adequate knowledge and understanding of how the ileum is adapted for the absorption of food.
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question.
- displays an adequate ability to discuss how the ileum is adapted for the absorption of food.

**Level 3 ([5]–[6])**

Overall impression: competent

- competent knowledge and understanding of how the ileum is adapted for the absorption of food.
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question.
- displays a competent ability to discuss how the ileum is adapted for the absorption of food.

[6]



- (d) Describe the physiological causes of the following conditions of the digestive system (AO1, AO2).

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

**Stomach ulcer**

- stomach walls begin to secrete too much acid
- the protective layer around the stomach (mucosa) gets weakened
- the result is the formation of a sore called an ulcer in the stomach wall

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

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

**Acute pancreatitis**

- the pancreas becomes inflamed (this is usually due to consumption of excess alcohol, or gall stones)
- pancreatitis (inflammation of the pancreas) occurs when the digestive enzymes it secretes start to attack the tissues of the pancreas. Essentially they begin to digest the pancreas
- as the gland becomes more inflamed this can lead to bleeding and infection
- the gland may no longer be able to function

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

- (e) Describe how this diagnosis may affect his leisure and education. (AO1, AO2, AO3)

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

**Leisure**

David clearly enjoys going out drinking with friends. He will need to stop drinking for a period, as further alcohol consumption would lead to further damage to the pancreas. David may find this difficult as he is at university and will want to spend time with his friends. David could socialise with his friends without drinking, there will be lots of social/sporting clubs in the university and perhaps he could participate in these to avoid being tempted by alcohol. During the initial flare up he may not be able to take part in sporting activities due to exhaustion.

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

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

**Education**

David will be hospitalised initially while doctors treat his pancreatitis. This will mean David will miss the start of this academic term. This may mean that David falls behind his peers in lectures and may struggle to catch up on the work he misses. David may be supported by the university to allow him to work from home/hospital and may be given extensions on any work due to avoid him falling behind.

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

3 (a) (i) Write down the names of the structures labelled **A**, **B**, **C** and **D**. (AO1)

**A**: kidney

**B**: ureter

**C**: bladder

**D**: urethra

(4 × [1])

[4]

(ii) State the two functions of the urinary system. (AO1)

excretion

osmoregulation

(2 × [1])

[2]

(b) (i) Discuss what happens at each of the following parts of the nephron.

(AO1, AO2, AO3)

- glomerulus and Bowman's capsule
- proximal convoluted tubule
- collecting duct

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

**glomerulus and Bowman's capsule** – ultrafiltration

- blood flowing through the glomerulus is under pressure as the diameter of the afferent arteriole is wider than that of the efferent arteriole
- this pressure forces small substances like urea, glucose, salts and water out of the blood, across epithelial cells, and into the Bowman's capsule
- most proteins are too large to be forced out of the blood vessel (large proteins are only seen in the urine if there is damage or infection in the kidney)
- some small proteins will be pushed out but these will be reabsorbed later
- all the glucose, water, salt and urea (which are all small molecules) are forced out of the blood vessel and into the Bowman's capsule and are now referred to as filtrate
- this is called ultrafiltration (filtration under pressure)

**proximal convoluted tubule** – reabsorption

- along this length of the nephron over 80% of the filtrate will be reabsorbed
- all of the glucose is taken back into the blood by diffusion and active transport as it is required for respiration
- some salts and water are also reabsorbed here

**collecting duct** – osmoregulation

- depending on the osmolarity of the blood, water will be reabsorbed in different amounts
- *too little water in the blood*, detected by the hypothalamus
- more ADH produced by the pituitary gland and travels to the collecting duct which becomes more permeable
- more water reabsorbed by the kidneys
- blood becomes less concentrated and urine more concentrated/less dilute

- *too much water in the blood*, detected by the hypothalamus
- less ADH produced by the pituitary gland
- collecting duct becomes less permeable
- blood becomes more concentrated and urine less concentrated/more dilute

All other valid points 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 what happens in each part of the nephron.
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question.
- displays a limited ability to discuss what happens at each part of the nephron.
- candidates addressing only one area of the nephron cannot achieve beyond this level.
- 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 what happens in each part of the nephron.
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question.
- displays an adequate ability to discuss what happens at each part of the nephron.
- candidates addressing only two areas of the nephron cannot achieve beyond this level.
- 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 organized 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 what happens in each part of the nephron.
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question.
- displays a competent ability to discuss what happens at each part of the nephron.
- candidates addressing all three areas of the nephron competently can achieve at the top of this level.

- quality of written communication is competent. The candidate successfully selects and uses the most appropriate form and style of writing. Relevant material is organized 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]

(ii) Identify the organ that produces urea. (AO1)

- liver  
(1 × [1]) [1]

(iii) Describe how urea is made. (AO1, AO2)

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

- excess amino acids (consumed in the diet) are taken to the liver where they are deaminated.
  - the amino acid is broken down into carbohydrate and ammonia.
  - the ammonia is converted into urea.
- [1] basic description [2] adequate description [3] competent description  
(1 × [3]) [3]

(c) Explain the physiological causes of type 1 and type 2 diabetes. (AO1, AO2)

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

**Type 1**

Type 1 diabetes is an autoimmune disease, the body's immune system attacks the cells of the pancreas damaging or destroying them completely. This prevents the cells being able to make enough/any insulin and the body is unable to control blood glucose levels within normal limits.

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

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

**Type 2**

Type 2 diabetes occurs when the pancreas is unable to produce enough insulin or the body cells develop a resistance to the insulin that is being released. There are several reasons why people develop type 2 diabetes but one of the most common causes is linked to obesity

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

- (d) Discuss how renal failure may impact on her income, diet and relationships. (AO1, AO2, AO3)

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

**Income**

Her income is likely to be reduced as it is unlikely that Martha will be able to continue to work (as she will require dialysis several times a week and each visit will require a lengthy visit to hospital). As Martha works for a school she is likely to be entitled to sick pay for a period of time which will supplement her income. As this diagnosis is so debilitating it is likely that Martha will receive benefits which will also supplement her income.

**Diet**

Martha will need to limit her intake of fluids as her kidneys are no longer working. If the body retains fluid, she will have swelling and fluid may build up in her lungs causing other health problems, therefore to prevent fluid buildup, the amount of fluid consumed needs to be reduced. She should limit the amount of protein she eats to help decrease waste in the blood. Urea is a byproduct of the excess protein we consume, reducing protein will reduce the amount of urea in the blood needing to be filtered. She should also decrease the amount of salt, potassium and phosphorus (electrolytes) in her diet.

**Relationships**

Martha will have regular visits to hospital which will mean she will have less time available to spend with her children. However, she may be determined to make sure her children do not suffer as a result of her illness and she may do her best to spend quality time with them and build new memories, making her relationship stronger. Martha's relationship with her husband may become strained due to the impact her health will have on their lifestyle. Martha's wider family circle may rally round to help with the children and caring for her, bringing them closer together. Martha may lose contact with work colleagues and friends as she will be feeling tired and weak and may not have the energy to spend time with them. She may develop new relationships with staff and other patients during dialysis.

All other valid points 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 renal failure will impact on income, diet and relationships.
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question.
- displays a limited ability to discuss the impact of how renal failure will impact on income, diet and relationships.
- candidates addressing only one area of lifestyle cannot achieve beyond this level.
- 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 renal failure will impact on income, diet and relationships.
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question.
- displays an adequate ability to discuss how renal failure will impact on income, diet and relationships.
- candidates addressing only two aspects of lifestyle cannot achieve beyond this level.
- 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 organized 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 renal failure will impact on income, diet and relationships.
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question.
- displays a competent ability to discuss how renal failure will impact on income, diet and relationships.
- candidates addressing all three aspects of lifestyle competently can achieve at the top of this level.
- quality of written communication is competent. The candidate successfully selects and uses the most appropriate form and style of writing. Relevant material is organized 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]

**Total**

**AVAILABLE  
MARKS**

35

**100**

## Sources

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