



Rewarding Learning

**ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2012**

Health and Social Care

Assessment Unit AS 14

assessing

Unit 14: Understanding Human Physiology

[A3H81]

TUESDAY 22 MAY, AFTERNOON

MARK SCHEME

1 (a) This is a diagram of the ear.

(i) Write down the name and function of parts A, B and C (AO1, AO2)

A Ear flap/Pinna

Function: funnels sound (into the ear)

B Ear drum/Tympanic membrane

Function: creates vibrations which can travel through the middle ear
passes vibrations to ear ossicles

C oval window

Function: carries vibrations to the inner ear

- Causes fluid in cochlea to vibrate.

All other valid points will be given credit

[1] For name

[1] For one function

(3 × [2])

[6]

(ii) Explain the following: (AO1)

Conductive hearing loss

- Failure of conduction of sound through the internal ear
- Due to frozen/ruptured ear drum/Damaged/frozen ear ossicles/
Round/oval window/ear wax/glue ear/ear infection.

All other valid points will be given credit

[1] for key phrase

[2] for full explanation

(1 × [2])

[2]

Sensorineural hearing loss

- Sound cannot be changed into electrical impulse
- Damage to the inner ear – the cochlea

Or

- Damaged auditory nerve
- The auditory nerve – The electrical impulses cannot be transmitted to the brain
- Sound waves cannot be processed
- Illness, e.g. mumps/measles
- Congenital.

All other valid points will be given credit

[1] for key phrase

[2] for full explanation

(1 × [2])

[2]

(b) Fahima has the eye condition hypermyopia.

(i) Explain how hypermyopia will affect Fahima's ability to see.
(AO1, AO2)

- she will be long sighted
- she will be able to see far objects clearly
- she will be unable to see near objects clearly
- near objects will appear blurred.

All other valid points will be given credit

[1] for key phrase

[2] for full explanation

(1 × [2])

[2]

Fahima has an increased risk of developing glaucoma in later life.

(ii) Explain one cause of glaucoma (AO1, AO2)

- Damage to the nerve cells/optic nerve at the back of the eye
- Caused by increased pressure in the eye
- Created by a build up of fluid in the eye.

All other valid points will be given credit

[1] for key phrase

[2] for full explanation

(1 × [2])

[2]

(iii) Discuss how the eye accommodates to view both near and distant objects: (AO1, AO2 and AO3)

Answers may address some of the following points:

- This the process by which the eye changes the shape of the lens
- To maintain a clear image formed on the retina

To see near objects

- The suspensory ligaments relax
- Pupil constricts
- The ciliary muscles contract
- The lens is fatter

To see distant objects

- The suspensory ligaments relax
- The ciliary muscles relax
- The lens becomes flattened
- Pupil dilates.

All other valid points will be given credit

Level 1 ([1]–[2])

Overall impression: basic understanding

- displays limited knowledge of the structure of the eye
- describes some of the mechanism of accommodation for near and distant sight
- limited discussion.

Level 2 ([3]–[4])

Overall impression: adequate knowledge and understanding

- displays some knowledge of the structure of the eye
- describes most of the mechanism of accommodation for near and distant sight
- adequate discussion.

Level 3 ([5]–[6])

Overall impression: Competent knowledge and understanding

- displays a good knowledge of the structure of the eye
- describes the mechanism of accommodation accurately for near and distant sight
- excellent discussion.

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

[6]

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MARKS

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2 (a) Jayne burnt her hand by accidentally putting it on the hot plate when it was switched on. Her response was to pull her hand away. This type of response is called a reflex action.

(i) Explain what is meant by a reflex action. (AO1, AO2)

- An involuntary movement
- Almost instantaneous in response to a stimulus.
- Brain not involved
- Not a conscious decision.

All other valid points will be given credit

[1] for key phrases

[2] for explanation

(1 × [2])

[2]

(ii) This is a diagram of a reflex arc in Jayne's arm.

Use the diagram above to discuss the passage of nerve impulses around the body which allowed Jayne to take this reflex action (AO1, AO2, AO3, and AO4)

Answers may include the following:

- Sensory nerve endings in the skin detect heat/pain
- An electrical impulse passes along a sensory neurone from the hand to the spinal cord
- The impulse is relayed via an association neurone in the spinal cord
- The impulse then passes to a motor neurone to the muscle/effector in the arm
- The muscle contracts causing the arm to lift almost instantly
- The brain is not involved in this action
- The nerve impulse is transmitted chemically across synapses between neurones
- The brain is informed after action.

All other valid points will be given credit

Level 1 ([1]–[3])

Overall impression: basic understanding

- displays some knowledge of nervous response
- limited discussion of the reaction
- limited discussion.

Level 2 ([4]–[6])

Overall impression: adequate knowledge and understanding

- displays adequate knowledge of nervous response
- adequate discussion of the reaction.

Level 3 ([7]–[8])

Overall impression: competent knowledge and understanding

- displays a good knowledge of nervous response
- excellent discussion of the reaction.

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

[8]

(b) George, aged 18 months, often develops fevers. During these, his body temperature rises rapidly and it is difficult to get it to return to the normal range.

(i) Write down the medical term for a fever. (AO1)

Pyrexia

(1 × [1])

[1]

(ii) Write down the normal range for body temperature. (AO1)

[1] For each correct value at bottom and top of range

36.6°C to 37.4°C ± 0.1

[2]

(iii) Discuss how each of the following contributes to returning George's body temperature to normal range. (AO1, AO2, AO3)

Answers may address some of the following points.

Sweat glands

- Open
- This releases sweat/lets sweat out of the body
- This increases heat loss
- This is evaporation.

Blood supply

- Vasodilation occurs
- Blood vessels near surface open wider
- Skin becomes red
- Heat is lost
- By radiation.

Hair follicles

- The muscle (erector pili) is relaxed
- The hair lies flat on the arm
- No air is trapped
- Skin is less insulated.

All other valid points will be given credit

[1] for key phrase

[2] for explanation

[3] for full discussion

(3 × [3])

[9]

(iv) Discuss how the nervous system and endocrine systems work together to control body temperature (AO1, AO2, AO3, AO4)

Answer may address some of the following points:

- heat is sensed by the skin and the hypothalamus which both contain thermo receptors
- When it is cold outside, messages are sent from the thermoreceptors in the skin/from deep thermal receptors/the blood to the cerebrum and the hypothalamus
- the cerebrum makes the person aware of being cold, and can cause voluntary behaviour, to, for example, put on a sweater
- hormones are released by the hypothalamus which stimulate the pituitary gland which releases a hormone
- this hormone acts on the thyroid to produce thyroxin, which increases cellular metabolism to make heat

- the heat regulating centre in the hypothalamus sends messages via the autonomic nervous system to the skin to stimulate involuntary response, e.g. shivering
- ADH production to conserve body fluid for sweating.

All other valid points will be given credit

Level 1 ([1]–[3])

Overall impression: basic understanding

- displays a limited knowledge of temperature control
- describes some of the mechanism correctly
- limited discussion
- quality of written communication is basic. The candidate makes a limited selection and use of 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 knowledge and understanding

- displays some knowledge of temperature control
- describes most of the mechanism correctly
- adequate discussion
- quality of written communication is adequate. The candidate makes a reasonable selection and use of 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 knowledge and understanding

- displays a good knowledge of temperature control
- describes the mechanism accurately at the top of band
- excellent discussion
- quality of written communication is competent. The candidate successfully selects and uses an appropriate form and style of writing. Relevant material is organised with a high degree of clarity and coherence. There is widespread use of appropriate specialist vocabulary. Presentation, spelling, punctuation and grammar are of a high standard to make meaning clear.

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

[9]

31

- 3 (a) (i) Discuss the role of each of the following in the process of digestion.
(AO1, AO2, AO3)

The mouth

- cuts up food with teeth
- mixes with saliva which contains amylase which starts breaking down starch
- mixes with saliva to moisten
- the tongue shapes the food into a pellet to help swallowing [3]

The duodenum

- most breakdown of food molecules takes place here
- produces enzymes to breakdown food from stomach
- mixes bile with food to emulsify fats [3]

The ileum

- final stages of digestion happen here
- enzymes are released to complete digestion of protein, carbohydrate and fats
- absorption of products of digestion (amino acids, fatty acids and glycerol) [3]

The colon

- extracts water waste
- extracts salts
- waste becomes solid. [3]

[1] for key phrase

[2] for explanation

[3] for full discussion

(4 × [3])

- (ii) This is a cross sectional diagram of villi in the gut.

Write down the name and one function of the cell labelled A
(AO1, AO2)

A Epithelial cell

Function: protection

[1] For name

[1] For function

(2 × [1])

[2]

- (iii) Discuss two ways that the structure of the villi aids its function.
(AO1, AO2, AO3)

Answers may address two of the following points:

- The villi are one cell thick so absorption can be rapid
- The villi have a rich blood network – absorbed materials are collected rapidly and taken around the body
- The villi are convoluted and have a big surface area so that all the absorption can take place.

[1] for key phrase

[2] for explanation

[3] for full discussion

(2 × [3])

[6]

(b) (i) Write down one common cause of acute pancreatitis (AO1)

[1] For cause

- Very excessive alcohol consumption/binge drinking (on even one occasion)
- Gallstones.

All other valid points will be given credit

[1]

(ii) Write down two symptoms of acute pancreatitis (AO1)

Answers may address some of the following points:

- abdominal pain under ribs spreading to the back
- nausea
- vomiting
- fever.

(2 × [1])

[2]

(iii) Discuss how acute pancreatitis may affect Geena's lifestyle.
(AO1, AO2, AO3 and AO4)

Answers may address the following points:

Work

- may be a 'one off attack' if caused by drinking/first job/bad impression/hinder prospects.

Diet and exercise

- may have alcohol sensitivity/need to stop drinking
- may have alcohol problem/need help to give up drinking/AA for support
- may need to adapt diet if gall bladder is problem/low fat diet.

Social life

- may have to stop drinking alcohol/not go out as much/may become isolated
- may feel excluded from work events/focus on clubbing/isolated at work.

Relationships

- may have to move out of flat if flatmate persists in drinking when she cannot
- may lose contact with university friends if she only saw them whilst out socially/in flat
- may make new friends/new flat/new hobbies
- may make new friends through AA/new hobby/cooking.

All other valid responses will be given credit

Level 1 ([1]–[3])

Overall impression: basic understanding

- displays a limited knowledge of the effects of pancreatitis
- limited discussion of the effect of lifestyle
- generic responses cannot achieve beyond this mark band
- quality of written communication is basic. The candidate makes a limited selection and use of 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 knowledge and understanding

- displays some knowledge of the effects of pancreatitis
- adequate discussion of the effect of lifestyle
- quality of written communication is adequate. The candidate makes a reasonable selection and use of 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 knowledge and understanding

- displays a good knowledge of the effects of pancreatitis
- excellent discussion of the effect of lifestyle
- quality of written communication is competent. The candidate successfully selects and uses an appropriate form and style of writing. Relevant material is organised with a high degree of clarity and coherence. There is widespread use of appropriate specialist vocabulary. Presentation, spelling, punctuation and grammar are of a high standard to make meaning clear.

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

[9]

32

- 4 (a) Complete the table below to identify one hormone and its function for each endocrine gland listed. (AO1, AO2)
[1] For each correct answer

Endocrine Gland	Hormone	Function
Ovaries	Oestrogen /Progesterone	Regulation of the menstrual cycle/ development of secondary sexual characteristics
Testes	Testosterone	Development/maintenance of secondary sexual characteristics
Thyroid	Thyroxin	Keeps metabolism active at correct pace • Stimulates thirst
Pancreas	Insulin or Glucagon	To turn blood glucose into glycogen To turn glycogen back into glucose in the blood Controls blood glucose levels

(8 × [1])

[8]

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MARKS

(b) Using the diagram above, analyse how the nephron filters the blood.

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Answers may address the following points:

- Blood is carried by the renal artery to the glomerulus of the Malpighian Body
- The blood pressure of the artery squeezes small molecules out of the glomerulus and into the lumen of the Bowman's capsule
- Molecules include water/amino acids/glucose/useful ions/urea
- In the proximal convoluted tubule reabsorption of useful substances water/glucose/useful ions begins
- In the loop of Henle water is recovered into the blood as are sodium ions using a counter current multiplier
- The distal convoluted tubule acts to maintain the pH balance of the blood and reabsorbs ions that are useful in metabolism
- The collecting ducts regulate the body's water balance under the influence of ADH (anti diuretic hormone)
- If the body needs water a high concentration of ADH is present so that water is reabsorbed into the blood
- If the body does not need water little ADH is present so little reabsorption occurs
- From the collecting ducts the final product -Urine goes to the ureter and then the bladder for storage
- The clean blood leaves the kidney via the Renal vein.

All other valid points will be given credit

Level 1 ([1]–[3])

Overall impression: basic understanding

- displays a limited knowledge of the functioning of the nephron
- limited analysis of the role of the parts of the nephron
- quality of written communication is basic. The candidate makes a limited selection and use of 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 knowledge and understanding

- displays some knowledge of the functioning of the nephron
- adequate analysis of the role of the parts of the nephron
- quality of written communication is adequate. The candidate makes a reasonable selection and use of 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 knowledge and understanding

- displays a good knowledge of the functioning of the nephron
- excellent analysis of the role of the parts of the nephron
- quality of written communication is competent. The candidate successfully selects and uses an appropriate form and style of writing. Relevant material is organised with a high degree of clarity and coherence. There is widespread use of appropriate specialist vocabulary. Presentation, spelling, punctuation and grammar are of a high standard to make meaning clear.

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

[9]

Total

**AVAILABLE
MARKS**

17

100