

Cambridge TECHNICALS LEVEL 3

Cambridge
TECHNICALS
2016


HEALTH AND SOCIAL CARE

Feedback on the June 2018 exam paper
(including selected exemplar candidate answers
and commentary)

Unit 4: Anatomy and physiology for health and social care

Version 1

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INTRODUCTION

This resource brings together the questions from the June 2018 examined unit (Unit 4), the marking guidance, the examiners comments and the exemplar answers into one place for easy reference.

We have also included exemplar candidate answers with commentary for questions 2(d), 3(b)(ii), 5(b) and 5(d)(ii).

The marking guidance and the examiner's comments are taken from the Report to Centre for this question paper.

The Question Paper, Mark Scheme and the Report to Centre are available from:

<https://interchange.ocr.org.uk/>

OCR
Oxford Cambridge and RSA

Level 3 Cambridge Technical in Health and Social Care
05831/05832/05833/05871

Unit 4: Anatomy and physiology for health and social care
Wednesday 6 June 2018 – Morning

Duration: 2 hours
C442/1806

You must have:
• No materials required

First Name: Last Name:

Centre Number: Candidate Number:

Date of Birth:

INSTRUCTIONS

- Use black ink.
- Complete the boxes above with your name, centre number, candidate number and date of birth.
- Answer all the questions.
- Write your answer to each question in the space provided.
- If additional answer space is required, you should use the lined paper(s) at the end of this booklet. The question number(s) must be clearly shown.

FOR EXAMINER USE ONLY

Question No	Marks
1	(2)
2	(2)
3	(1)
4	(1)
5	(1)
Total	(10)

INFORMATION

- The total mark for this paper is 100.
- The marks for each question are shown in brackets [].
- Quality of extended response will be assessed in questions marked with an asterisk (*).
- This document consists of 16 pages.

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Unit 4: Anatomy and physiology for health and social care
Level 3 Cambridge Technical in Health and Social Care
05830 – 05833

Mark Scheme for June 2018

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Unit 4 Anatomy and physiology for health and social care

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GENERAL EXAMINER COMMENTS ON THE PAPER

The overall performance of candidates was mixed, but some candidates generally demonstrated a sound knowledge of the majority of the specification.

There was a small but significant number of candidates who were challenged by this unit. Centres would benefit from reviewing the 'i.e.' within the specification to ensure everything has been covered.

Resources which might help address the examiner comments:

From the link below, you'll find 'The OCR guide to examinations' (along with many other skills guides)

<http://www.ocr.org.uk/i-want-to/skills-guides/>

Command verbs definitions

<http://www.ocr.org.uk/Images/273311-command-verbs-definitions.pdf>

Questions 1(a) and (b)

Answer **all** the questions.

- 1 (a) Identify which part of the body has the type of joint in the table below.

Choose from the following:

Knee Cranium Wrist Hip Neck

Type of joint	Part of the body
Fixed joint	CRANIUM
Pivot joint	NECK
Sliding joint	WRIST
Ball and socket joint	HIP
Hinge joint	KNEE

[5]

- (b) Many people have arthritis that affects their joints.

Explain **two** different possible causes of arthritis.

- 1.. **Two** marks for an explanation. **Two** required.

Osteoarthritis:

- • wear and tear on joints – linked to sports etc
- • cartilage worn away by friction
- • other conditions (secondary arthritis)
- • age – more common after menopause
- • family history

- 2..
- • obesity
 - • female (possibly due mainly to posture and joint alignment)
 - • previous injury.

.... **Rheumatoid arthritis:**

- • autoimmune response
- • damages the cartilage (as if it were a “foreign body”)
- • thin layer of cells (synovium) become sore/inflamed
- • releases chemicals that damage bones, cartilage, tendons, ligaments
- • chemicals cause the joint to lose its shape and alignment
- • eventually destroys the joint completely
- • risk factors – genes/hormones/smoking
- • more common in females – probably genetic – most common ages 30–50.

[4]

Mark Scheme Guidance

Question 1(a):

Annotation:

The number of ticks must match the number of marks awarded.

For an **incorrect** answer use the **cross**.

Allow alternative examples if correct.

Question 1(b):

Annotation:

The number of ticks must match the number of marks awarded.

For an **incorrect** answer use the **cross**.

The name of the type of arthritis is not required. Both examples could be from one type only.

Two marks for each explanation.

For each cause:

- **one mark** for cause given
- **one mark** for further explanation provided.
- **ALLOW** risk factors.

Accept reduction in quantity of synovial fluid.

Accept reduction in size of gap.

Examiner comments

Identification of the different types of joint in part (a) was answered accurately by many candidates, with the answer to “sliding joint” proving the least well known. Examples are given in 4.2 of the specification.

The causes of arthritis and the possible treatments were known adequately by the majority of candidates.

Question 1(c)

(c) Identify **four** possible treatments for arthritis.

- 1... **One** mark for an identification. **Four** required.
- Any **four** points:
- Physiotherapy
 - Occupational therapy
- 2... ..
- Podiatry
 - Exercise
- 3... ..
- Hydrotherapy
 - Painkillers
- 4... ..
- NSAIDs/anti-inflammatory
 - Steroids
 - DMARDs
 - Biological treatments
 - JAK inhibitors
 - Weight reduction if obesity part of cause
 - Wearing suitable footwear
 - Using special devices to reduce the strain on your joints during everyday activities
 - If particularly severe then surgery (accept without further detail for one mark, but no mark if incorrect detail given e.g. addition of cartilage or synovial fluid)
 - Artificial joint replacement (Arthroplasty)
 - Fusion of joint (Arthrodesis).
- [4]**

Mark Scheme Guidance

Annotation:

The number of ticks must match the number of marks awarded.

For **incorrect** answers use the **cross**.

NOT HRT.

Medication without further detail is TOO VAGUE.

Surgery is TOO VAGUE.

Do NOT accept "surgery to replace cartilage".

If alternative answer given, check with reliable source and allow if correct (e.g. Arthritis U.K.).

Question 1(d)

(d)* Multiple Sclerosis (MS) is caused by damage to the myelin sheath. The myelin sheath is a fatty layer that surrounds and protects the nerves.

The immune system attacks the myelin sheath and damages it, sometimes damaging the underlying nerves.

This means the messages that travel along the nerves may be disrupted or slowed down.

Individuals with MS may not be able to control the movement of their joints.

Explain the likely impact MS may have on an individual's movement.

[9]

Likely impacts of MS on movement:

- Plaques on long motor nerve tracts in brain or spinal cord may affect walking
- Leg may drag.
- Plaques on motor neurons to arms may cause "shakes" and/or loss of coordination.
- Plaque on fibres in brainstem may affect balance.
- Alternative periods of remission and relapses.
- Progressive.
- Spasm – may be painful deters from further movement.
- Spasticity – muscles become stiff and resistant to movement.
- Ataxia – difficulty with movement and coordination.
- Tremor – shaking of limbs.
- Dizziness and vertigo – leads to fear of attempting movement.
- Musculo-skeletal pain indirectly caused by poor posture or gait – puts pressure on lower back and hips – deters further movement.
- Slowing of impulse transmission may make reflexes inadequate/lacking for protection purposes.
- Progression may lead to eventual paralysis and being confined to wheelchair.
- Neuropathic pain (caused by disease itself) may deter from attempting movement.
- In MS demyelination of nerve tissues means nervous impulses cannot be carried correctly.
- Impulses may "jump" or short circuit or be transmitted more slowly than normal.
- Scar tissue or plaques develop at site(s) of damage.
- Effects depends on siting of these plaques.

Mark Scheme Guidance

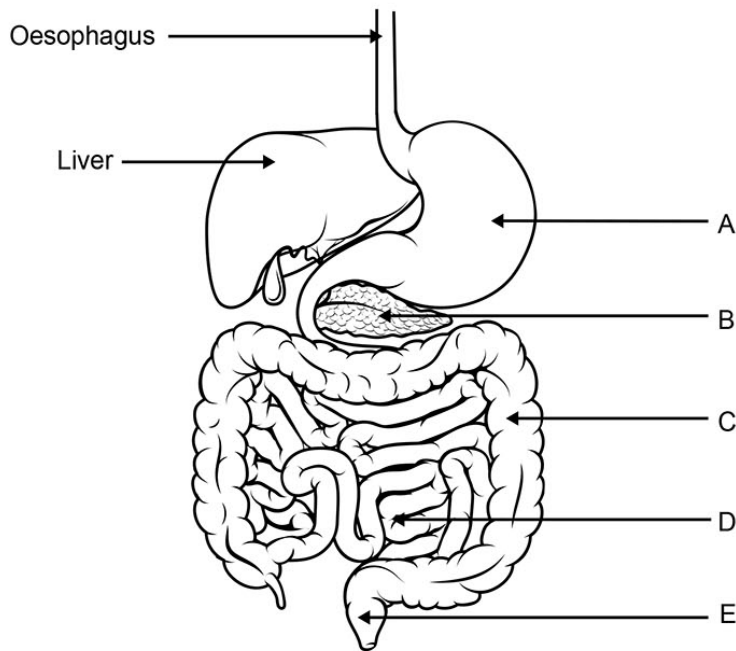
Content	Levels of response
<p>This is a levels of response question – marks are awarded on the quality of the response given. The focus of the question is explanation.</p> <p>Annotation: The number of ticks will not necessarily correspond to the marks awarded.</p> <p>Level 3 – checklist</p> <ul style="list-style-type: none"> • detailed explanation • related to movement • two or more impacts • factually accurate • correct terminology • QWC – high <p>Level 2 – checklist</p> <ul style="list-style-type: none"> • sound explanation • one or two impacts • related to movement • mostly factually accurate • some correct use of terminology • Sub–max of 3 if only one impact done well • QWC – mid <p>Level 1 – checklist</p> <ul style="list-style-type: none"> • limited/basic explanation • may be other effects of MS and little about movement • limited use of terminology • list like/muddled • QWC – low 	<p>Level 3 [7–9 marks]</p> <p>Answers provide a detailed explanation of two or more likely impacts of MS explicitly related to movement. Answers will be coherent, logically structured factually accurate and use appropriate terminology. There will be few, if any, errors of grammar, punctuation and spelling.</p> <p>Level 2 (4–6 marks)</p> <p>Answers provide a sound explanation of one or two likely impacts of MS on movement. Answers will be factually accurate, presented with some structure and use appropriate terminology. There may be some errors of grammar, punctuation and spelling.</p> <p>Level 1 [1–3 marks]</p> <p>Answers provide a limited description of the likely impacts of MS on movement. May be a description/identification only. Use of appropriate terminology may be limited. Answers may be list like, muddled, demonstrating little knowledge or understanding. Errors of grammar and spelling may be noticeable and intrusive.</p> <p>Sub–max of 3 if only one impact done well.</p> <p>0 marks – response not worthy of credit.</p>

Examiner comments

Part (d) proved extremely challenging for most candidates. A number wrote about a variety of effects rather than limiting themselves to writing about effects on movement as required by the question.

Question 2(a)

2 The diagram below shows the digestive system.



(a) Identify the labelled parts shown on the diagram.

Choose from the words given below: **One** mark for an identification. **Five** required.

Anus Gall bladder Large intestine Pancreas
 Rectum Small intestine Stomach

Labelled part	Name of labelled part
A	Stomach
B	Pancreas
C	Large intestine
D	Small intestine
E	Rectum

[5]

Mark Scheme Guidance

Annotation:

The number of ticks must match the number of marks awarded.

For **incorrect** answers use the **cross**.

Examiner comments

Most candidates were able to name the parts of the digestive system, although a number confused the large and small intestines, and labelled the rectum as the anus.

Questions 2(b) and (c)(i)

(b) Complete this description about pancreatic juices.

Use words from the list provided. **One** mark for an identification. **Five** required.

acid alkaline enzymes fats large proteins small

Pancreatic juices play a part in digestion. They are released from the pancreas

into the **SMALL** intestine. They neutralise the chyme (partially

digested food from the stomach) because they are **ALKALINE**.

Pancreatic juices contain chemicals called **ENZYMES** which

break down the food into smaller soluble molecules. These chemicals break down

all three of the major food groups - carbohydrates, **FATS**

and **PROTEINS**.

[5]

(c) (i) Name a malfunction of the digestive system.

One mark for an identification. **One** required.

- Coeliac disease
- Irritable Bowel Syndrome (IBS)
- Gallstones.

[1]

Mark Scheme Guidance

Question 2(b):

Annotation:

The number of ticks must match the number of marks awarded.

For **incorrect** answers use the **cross**.

The two last answers (fats and protein) may be in any order.

Question 2(c)(i):

Annotation:

The number of ticks must match the number of marks awarded.

For **incorrect** answers use the **cross**.

Examiner comments

Question 2(b) – The description of pancreatic juices was answered reasonably well by most candidates.

All but a small number of candidates could identify a malfunction of the digestive system. The later descriptions of the effects that the malfunction has on the digestive system were quite often inaccurate or confused.

Questions 2(c)(ii)

(ii) Describe how the digestive system is affected by the malfunction in (c)(i).

Four marks for a description.

Coeliac Disease:

- hypersensitivity to gluten
- causes autoimmune response
- walls of villi attacked
- microvilli become damaged
- villi appear flattened
- surface area reduced
- absorption of digestive products reduced/weight loss
- abdominal pain.

Need mention of (micro)villi destruction or reduced surface area for full marks.

[4]

IBS:

- intestinal disorder
- affects the colon (the large intestine)
- muscles in colon do not work at the right speed
- or coordination with muscles in the rectum or pelvis is interrupted
- leads to abdominal cramps/spasm, bloating, constipation and diarrhoea/pain.

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Gallstones:

- block the normal flow of bile
- lodge in the ducts that carry bile from the liver to the small intestine
- bile builds up in your gall bladder leading to attacks
- gall bladder attacks cause pain in the upper right abdomen.

Mark Scheme Guidance

Annotation:

The number of ticks must match the number of marks awarded.

For **incorrect** answers use the **cross**.

Four marks:

- for a detailed, accurate description.

Three marks:

- for a well-developed description.

Two marks:

- for a description showing some understanding.

One mark:

- for a simplified descriptions that lacks clarity.

Examiner comments

The later descriptions of the effects that the malfunction has on the digestive system were quite often inaccurate or confused.

Question 2(d)

(d)* Homeostasis regulates the conditions inside our body. Body temperature, blood sugar level and water content are all examples of the internal conditions it regulates.

Negative feedback mechanisms are used in the body to achieve homeostatic control.

Describe how the negative feedback mechanisms work in the body.

Feedback mechanisms involved in maintaining a steady level of various chemicals in the body.

Blood glucose system:

- glucose levels monitored and controlled by cells in Islets of Langerhans in pancreas
- after a meal blood glucose level rises and is detected
- cells release insulin
- this enables cells to take up glucose
- cells in liver and muscles change glucose to glycogen (storage compound)
- blood glucose level falls
- detected by cells
- insulin production stops
- blood glucose levels drop due to metabolic activity/exercise etc
- cells detect this
- release glucagon
- causes (stored) glycogen to be turned back into glucose
- released into blood stream
- blood glucose levels rise
- detected
- glucagon release stops.

Osmoregulation and ADH:

- Pituitary gland produces ADH – affects permeability of nephron to water
- If blood water concentration fall, ADH production increases
- More water returned to blood
- Balance restored
- If blood water concentration rises
- Less ADH produced
- Less water returned to blood.

...[8]

Heat regulation

- Hypothalamus senses temperature changes
- Vasodilation when hot brings more blood close to surface of skin
- Sweat glands release sweat – evaporation cools blood
- Vasoconstriction when cold – keeps blood away from body surface to reduce heat loss
- Hairs raised to trap air close to skin surface (insulator)
- Muscles shivering produces heat in muscles.

Mark Scheme Guidance

Content	Levels of response
<p>This is a levels of response question – marks are awarded on the quality of the response given. The focus of the question is explanation.</p> <p>One system described in both directions can count as two mechanisms</p> <p>Annotation: The number of ticks will not necessarily correspond to the marks awarded.</p> <p>Level 3 – checklist</p> <ul style="list-style-type: none"> • detailed explanation of feedback • two mechanisms need not be given in equal detail • well-developed, clear and logically structured • factually accurate • correct use of terminology • QWC – high <p>Level 2 – checklist</p> <ul style="list-style-type: none"> • basic explanation • mostly factually accurate • mostly relevant information • some correct terminology • QWC – mid <p>Level 1 – checklist</p> <ul style="list-style-type: none"> • limited explanation • information may not be relevant • limited structure may be list like/muddled • minimal use of terminology • QWC – low <p>If candidates mention blood and pH in relation to breathing this should be credited if correct.</p>	<p>Level 3 [7–8 marks]</p> <p>Answers provide a fully detailed description of at least two feedback mechanisms in the body. Sentences and paragraphs are relevant and follow a logical sequence with accurate use of appropriate terminology. There will be few, if any, errors of grammar, punctuation and spelling.</p> <p>Level 2 (4–6 marks)</p> <p>Answers provide a basic description of at one/two feedback mechanisms in the body. Answers will be factually accurate, presented with some structure and use appropriate terminology. There may be some errors of grammar, punctuation and spelling.</p> <p>Level 1 [1–3 marks]</p> <p>Answers provide a limited description of one feedback. Use of appropriate terminology will be limited. Answers may be list like, muddled, demonstrating little knowledge or understanding. Errors of grammar and spelling may be noticeable and intrusive.</p> <p>0 marks – response not worthy of credit.</p>

Examiner comments

Part (d) about negative feedback mechanisms was a question which discriminated well between candidates. Weaker candidates were able only to paraphrase the stem of the question, giving little additional information. A few candidates chose to give very detailed answers concerning how feedback mechanisms work. The quality of these answers was often high. The majority of candidates chose specific mechanisms. Many of these descriptions gained Level 3 marks without huge amounts of detail. Some became confused, particularly between the effects of insulin and glucagon in blood sugar regulation thus reducing their mark.

Exemplar candidate work

Question 2(d) – Low level answer

7

Pituitary

Pituitary

(d)* Homeostasis regulates the conditions inside our body. Body temperature, blood sugar level and water content are all examples of the internal conditions it regulates.

Negative feedback mechanisms are used in the body to achieve homeostatic control.

Describe how the negative feedback mechanisms work in the body.

Negative feedback mechanisms react when the body meets certain conditions. When the body temperature rises above 37°C , the ~~p. back~~ pituitary gland ~~produces~~ stops retaining water to cool the body temperature. When the blood sugar level decreases, the body produces insulin that increases the glucose in the blood. ~~It~~ If an individual is dehydrated, the pituitary gland releases FSH which retains the remaining water inside the body. When the body temperature decreases less than 37°C , it begins to shiver to bring the temperature up.

[8]

Commentary

Candidates had been given examples of homeostatic systems and asked to describe feedback mechanisms. This low level answer was given some credit for recognising the optimum body temperature. Although they identified Insulin, the description they gave was incorrect. Some credit was given for identifying shivering as being involved in raising the body temperature although there was insufficient detail to lift the answer into a higher level.

The candidate mentioned stopping water retention in relation to the body being hot. This muddled answer was potentially related to two different homeostatic mechanisms (osmoregulation and thermoregulation) but neither was specified.

To achieve a higher level mark based on the information partly known by the candidate there would need to be more precise information given: e.g. "When the body is cold shivering in the muscles releases heat which raises the body temperature. The shivering then stops because the body has got back to its normal temperature of 37 degrees. When the body is too hot water is released by sweating. This cools the surface of the skin and therefore the body cools down. The sweating then stops because the body is back to its normal temperature."

This would be sufficient for a mark in Level 2. If vasodilation and vasoconstriction were included and the language was rather more technical, or if another system was described at a similar level of detail, then a mark in Level 3 could be achieved.

Exemplar candidate work

Question 2(d) – Medium level answer

(d)* Homeostasis regulates the conditions inside our body. Body temperature, blood sugar level and water content are all examples of the internal conditions it regulates.

Negative feedback mechanisms are used in the body to achieve homeostatic control.

Describe how the negative feedback mechanisms work in the body.

In the brain Hypothalamus regulates and controls homeostasis. It regulates by maintaining negative feedback such as body temperature. The maximum body temperature before enzyme denature is 37°C . This means if enzyme denature the process of ~~homeostasis~~ homeostasis will be affected. To regulate body temperature the body must read the current ~~temp~~ temperature of the human body. If an individual is hot, the body will start to secrete ^{excess body} body fluid and fluid which is also known as sweat. From this the body will begin to optimise the temperature so as to a regular state. If the body is cold, it will begin to shiver. Blood will rise to the skin surface in a tempt to secure heat. ~~How~~ Sensitive hairs will raise up due to the nature.

Blood sugar levels are regulated by negative feedback mechanisms. ^{hypertension} ~~hypertension~~ is low blood pressure which is 30/80 measurements. ~~value of hypertension~~, also known as high blood pressure is 160 or above.

Commentary

This answer gave a reasonably clear overview of thermoregulation, obliquely mentioned the role of the hypothalamus in homeostasis, and simply explained the importance of the process. It was thus placed in the medium range of marks. The description of the actual mechanisms included vasodilation (although not given its technical name) was still slightly vague in places and only one system was described. The final paragraph was confused and incorrect, muddling two different systems.

In order to achieve a higher level mark, the description of thermoregulation requires greater precision and/or the use of more technical terminology. Alternately the answer could be improved by correct discussion of another homeostatic mechanism.

Exemplar candidate work

Question 2(d) – High level answer

(d)* Homeostasis regulates the conditions inside our body. Body temperature, blood sugar level and water content are all examples of the internal conditions it regulates.

Negative feedback mechanisms are used in the body to achieve homeostatic control.

Describe how the negative feedback mechanisms work in the body.

When the body is too hot or too cold, it is detected by the hypothalamus in the brain. If the body is too hot, it will start to sweat and vasodilation will take place in attempt to cool the body ~~down~~ down. If the body is too cold, it will start to shiver and vasoconstriction will take place so that the body can warm up.

When the blood sugar levels are too high or low, the body changes how much insulin or glucagon is secreted.

If water content levels are too high or low, the body adjusts the amount of ADH being secreted. [8]

Commentary

This answer shows a clear and relatively detailed understanding of thermoregulation. This section of the answer alone would satisfy the requirements for a medium level response.

The descriptions of blood sugar regulation and osmoregulation are correct insofar as they go but contain no detail.

This answer achieves a high level mark as three systems have been correctly described. The mark could be increased to the top of the level by the addition of greater detail in one of the other systems.

Questions 3(a) and (b)(i)

3 (a) Identify which part of the eye is responsible for each of the following functions.

Choose your answer from the list provided: **One** mark for correct identification of the part of the eye.
Five required.

Pupil Conjunctiva Cornea Iris Macula Retina Tear gland

Function	Part of the eye
Produces liquid to moisten the surface of the eye	Tear glands
Forms a thin protective layer (mucous membrane) covering the front of the eye and lines the inside of the eyelids	Conjunctiva
The first part of the eye to focus the light and the outermost layer that is transparent and convex in shape	Cornea
The coloured part of the eye that controls the amount of light entering the eye	Iris
The lining of the back of the eye that contains cells which are sensitive to light	Retina

[5]

(b) (i) Some people develop cataracts in their eyes.

Explain how cataracts affect the functioning of the eye.

Three marks for an explanation.

Explain how cataracts affect functioning of the eye:

- Cataracts are clouding of **lens**
- Lens completes focusing of light on retina
- Light is poorly focussed initially – may not be noticed
- Increasing cloudiness eventually means vision becomes blurred/eventual sight loss
- Colour acuity may lessen due to light being scattered differently
- Halos around lights
- Poor night vision.

[3]

Mention of **lens** required for full marks.

Mark Scheme Guidance

Question 3(a):

Annotation:

The number of ticks must match the number of marks awarded.

For **incorrect** answers use the **cross**.

Question 3(b)(i):

Annotation:

The number of ticks must match the number of marks awarded.

For **incorrect** answers use the **cross**.

Three marks:

- for a well-developed explanation.

Two marks:

- for an explanation showing some understanding.

One mark:

- for a simplified explanation that lacks clarity.

Examiner comments

Question 3 – The straightforward linking of parts of the eye with their function provided a reasonable level of discrimination. The most commonly incorrect answers were for the conjunctiva and cornea. Many candidates confused the pupil with the iris. Most candidates could describe the effects of cataracts, although a small number wrote about macular degeneration.

Questions 3(b)(ii) and (c)

(ii)* Describe the monitoring and treatments used for cataracts.

Monitoring for cataracts:
• Eye tests
• Visual acuity exam
• Regular check-ups.

.....
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.....
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.....
.....

[5]

(c) Nerve cells are made up of several different components which have different functions.

(i) Nerve cells have long processes called axons and dendrons.

What is the difference between the function of an axon and the function of a dendron?

Axons carry "message" away from cell body (soma) (1).
Dendrons carry "message" towards from cell body (soma) (1).
If candidate identifies that direction is different award 1 mark.
Second mark requires relative direction to be correct.

.....
.....
.....
.....

[2]

(ii) Describe what happens at a synapse.

Synapse is gap between two nerve cells.
Neurotransmitter (chemical) released from one side (1).
Triggers ongoing message at other side of gap (1).

.....
.....
.....

[2]

Mark Scheme Guidance

Question 3(b)(ii):

Content	Levels of response
<p>This is a levels of response question – marks are awarded on the quality of the response given. The focus of the question is assessment.</p> <p>Annotation: The number of ticks will not necessarily correspond to the marks awarded.</p> <p>Level 2 – checklist</p> <ul style="list-style-type: none"> • detailed description • monitoring and one treatment well done • well-developed, clear and logically structured • factually accurate • QWC – high <p>Level 1 – checklist</p> <ul style="list-style-type: none"> • limited/basic • one treatment • limited structure may be list like/muddled • QWC – mid - low 	<p>Level 2 [4–5 marks]</p> <p>Answers provide a detailed description of monitoring and treatment for cataracts. Answers include accurate use of terminology and follow a logical sequence. Sentences and paragraphs are relevant. There will be few errors, if any, of grammar, punctuation and spelling.</p> <p>Level 1 [1–3 marks]</p> <p>Answers provide a description of monitoring and treatment for cataracts in a limited manner. At the lower end answers may be list like, muddled, demonstrating little knowledge or understanding. Errors of grammar and spelling may be noticeable and intrusive.</p> <p>0 marks – response not worthy of credit.</p>

Question 3(c)(i):

Annotation:

The number of ticks must match the number of marks awarded.

For **incorrect** answers use the **cross**.

Question 3(c)(ii):

The number of ticks must match the number of marks awarded.

For **incorrect** answers use the **cross**.

ALLOW one mark for simple identification of what a synapse is.

Examiner comments

Question 3(b)(ii) – Most candidates had some idea of monitoring and treatment for cataracts, but few answers contained sufficient information for full marks.

Question 3(c)(i) – Very few candidates knew the difference between the function of an axon and a dendron. Many referred to carrying messages to and from the brain.

Question 3(c)(ii) – The description of events at a synapse was reasonably well known.

Exemplar candidate work

Question 3(b)(ii) – Low level answer

(ii)* Describe the monitoring and treatments used for cataracts.

one treatment for cataracts could be surgery where they ~~remove~~ may inject the eye to release the pressure, this can be monitored by regular check ups with the doctor. Another treatment that can be carried out is surgery where they remove the clear layer in the eye and replace it with another one. vision tests can be carried out to monitor the sight. [5]

Commentary

This answer is very muddled as in places the candidate is confusing cataracts with glaucoma.

If the candidate had specified that the surgery involved removal and replacement of the lens in the eye the answer would have been improved.

Exemplar candidate work

Question 3(b)(ii) – High level answer

(ii)* Describe the monitoring and treatments used for cataracts.

Individuals can go for regular eye check ups to make sure it does not get worse. They can have a cataract surgery to remove the lens and for it to be replaced with an artificial lens. Also individuals can wear powerful glasses that will help them see clearly. When they are reading books or newspapers they can use a magnifier so it enlarges the words and so they can read and see it clearly. [5]

Commentary

This answer shows a clear understanding of what cataracts are and how they are monitored and treated.

A different ordering of the answer showing understanding of the progressive nature of the deterioration in eyesight over time and perhaps suggesting other early interventions (e.g. better lighting) could have improved the answer to achieve full marks.

Questions 4(a) and (b)

4 (a) Explain **two** reasons why the heart is referred to as a **double pump**.

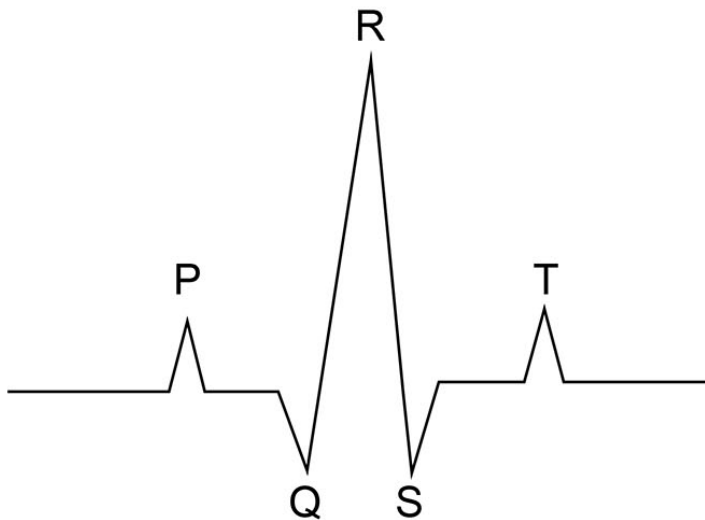
1... **Two** marks for an explanation. **Two** required.

Reasons why the heart is referred to as a **double pump**:

- • Two completely separate sides (L & R) – blood kept separate so functions as two pumps
- • Top chambers (atria) contract – two lower chambers (ventricles) contract separately
- 2... • Right side pumps blood to lungs – left side pumps blood around the body – two separate circuits
- • Blood passes through the heart twice to make a complete circuit
- • Blood at R side is de-oxygenated/blood at L side is oxygenated.

[4]

(b) The diagram below shows an electrocardiogram (ECG) trace.



An ECG is a commonly used technique for diagnosing problems with heart function.

Explain what an ECG trace can tell us about what is happening in the heart.

Four marks for an explanation.

What the ECG trace tells us about what is happening in the heart:

- • waves represent the electrical activity of heart
- • different sections represent different activities within heart
- • P wave at the beginning shows atrial contraction
- • QRS shows ventricular contraction (systole)
- • T ventricles relaxing (diastole) – repolarisation
- • if waves disordered/out of rhythm etc. indicates which part of the heartbeat is "wrong"
- • shows if heart rate is too fast
- • shows if heart rate is too slow
- • shows if heart rate is irregular
- • indicates abnormal heart conditions (heart attack/heart valve conditions).

[4]

Mark Scheme Guidance

Question 4(a):

Annotation:

The number of ticks must match the number of marks awarded.

For **incorrect** answers use the **cross**.

Two marks for each reason given.

One mark:

- for reason stated.

Two marks:

- for reason stated and further explanation provided.

Question 4(b):

Annotation:

The number of ticks must match the number of marks awarded.

For **incorrect** answers use the **cross**.

Link to electrical activity required to satisfy **explain**. **Three** marks available if this is missing.

Four marks:

- for a detailed, accurate description.

Three marks:

- for a well-developed description.

Two marks:

- for a description showing some understanding.

One mark:

- for a simplified descriptions that lacks clarity.

Examiner comments

Question 4(a) – Relatively few candidates understood why the term double pump was used to describe the heart. Many answers were muddled and contradictory.

Question 4(b) – A good number of candidates were able to identify what the various parts of the ECG showed.

Questions 4(c) and (d)

(c) Describe how blood plasma becomes tissue fluid and lymph.

Four marks for a description.

How blood plasma becomes tissue fluid and lymph:

- blood plasma in capillaries – forced out through “leaky” capillary walls
- by hydrostatic pressure (pressure from heart pumping)
- fluid carries nutrients and oxygen to cells of tissues (now known as tissue fluid)
- this fluid must return to circulatory system otherwise oedema occurs
- majority of fluid returns to capillaries
- remaining fluid (10%) drains into lymph vessels
- this re-joins blood system near top of body.

[4]

(d) (i) Identify two functions of the kidney.

1. Any **two** from:
 - Removal of urea
2.
 - Regulation of water levels/Osmoregulation
 - (Ultra)filtration (filters blood)
 - Reabsorption
 - Salt regulation
 - Urine production.

[2]

(ii)* Describe how the kidney carries out its functions.

- Blood in renal artery enters glomerulus.
- Blood at very high pressure so much of plasma forced out (*ultrafiltration*).
- Small molecules (urea, glucose, amino acids, vitamins, mineral salts) removed with much of the water.
- Blood cells and proteins remain in blood as too large (if kidney working properly).
- Along proximal tubule most of the water, all glucose, amino acids, vitamins and most mineral salts move back into blood vessel running alongside (*reabsorption*).
- NO urea returns.
- In medulla (Loop of Henle) a specialist blood supply removes salt from urine which then allows more water back into blood to balance osmotic potential of body (*osmoregulation*).
- Blood leaving in renal vein should have no urea but other substances in balance (*removal of urea*).
- Collecting ducts lead urine to the bladder.

[7]

Mark Scheme Guidance

Question 4(c):

Annotation:

The number of ticks must match the number of marks awarded.

For **incorrect** answers use the **cross**.

Four marks:

- for a well-developed description with all three fluids mentioned.

Three marks:

- for a well-developed description with possibly only two of the fluids linked.

Two marks:

- for a description showing some understanding.

One mark:

- for a simple description/statement that lacks clarity.

Question 4(d)(i):

Annotation:

The number of ticks must match the number of marks awarded.

For **incorrect** answers use the **cross**.

One mark for each correct answer.

Question 4(d)(ii):

Content	Levels of response
<p>This is a levels of response question – marks are awarded on the quality of the response given. The focus of the question is description.</p> <p>Annotation: The number of ticks will not necessarily correspond to the marks awarded.</p> <p>Level 3 – checklist</p> <ul style="list-style-type: none"> • detailed description (2 functions) • well-developed, clear and logically structured • factually accurate • correct use of terminology • QWC – high <p>Level 2 – checklist</p> <ul style="list-style-type: none"> • description • mostly factually accurate • mostly relevant information • some correct use of terminology • QWC – mid <p>Level 1 – checklist</p> <ul style="list-style-type: none"> • basic description • information may not be relevant • limited structure may be list like/muddled • minimal use of terminology • QWC – low 	<p>Level 3 [6–7 marks]</p> <p>Answers provide a fully detailed description of how the kidney carries out at least two of its functions. Sentences and paragraphs are relevant and follow a logical sequence with accurate use of appropriate terminology. There will be few errors, if any, of grammar, punctuation and spelling.</p> <p>Level 2 (4–5 marks)</p> <p>Answers provide a description of how the kidney carries out at least two of its functions and includes some accurate use of terminology. Answers are presented with some structure and are relevant using some accurate terminology. There may be some errors of grammar, punctuation and spelling.</p> <p>Submax 4 for one function done well.</p> <p>Level 1 [1–3 marks]</p> <p>Answers provide a limited description of how the kidney carries out its function(s).</p> <p>Answers may be list like, muddled, demonstrating little knowledge or understanding. Errors of grammar and spelling may be noticeable and intrusive.</p> <p>0 marks – response not worthy of credit.</p>

Examiner comments

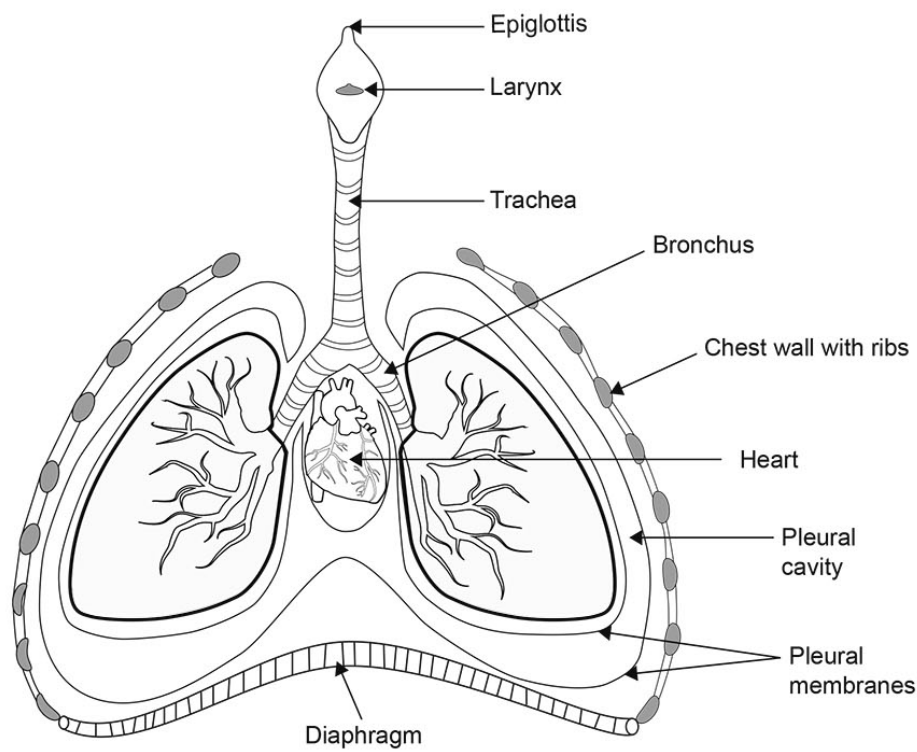
Question 4(c) – The number of candidates who had any idea about the relationship between blood plasma, tissue and lymph was very small. The majority simply paraphrased the question, gaining no marks.

Question 4(d)(i) – The kidney was poorly known or understood.

Question 4(d)(ii) – Most candidates could give one or two functions of the kidney, but when it came to describing how these functions were carried out, many gave no correct information. Answers rarely linked the process(es) with kidney physiology.

Question 5(a)

5 The diagram below shows the human respiratory system:



(a) Identify which parts of the respiratory system in the diagram above carry out the following functions. **One** mark for an identification. **Three** required.

Function	Part of the Respiratory system
Covers the airway during swallowing to prevent food entering the lungs	Epiglottis
Produces sound and speech	Larynx
Contains cartilage to keep the airway open even when lying down	Trachea (accept bronchus)

[3]

Mark Scheme Guidance

Annotation:

The number of ticks must match the number of marks awarded.

For **incorrect** answers use the **cross**.

Examiner comments

Most candidates were able to correctly identify the parts of the respiratory system.

Questions 5(b) and (c)

(b)* Explain how breathing takes place.

Your answer should refer to some of the labelled parts of the diagram.

How breathing occurs.

Breathing in:

- nervous messages are sent to the diaphragm and intercostal muscles
- intercostal muscles (between the ribs) contract – raising the ribcage upwards and outwards
- diaphragm muscle contracts – moving in a downward direction
- pleural membranes are attached to lungs, inside of ribcage and diaphragm therefore movement of the lungs is brought about
- air is brought into the lungs because of resultant pressure and volume changes.

Breathing out

- nervous impulse stops and diaphragm and intercostal muscles relax
- rib cage swings down and in due to gravity
- diaphragm returns to its dome – shaped position
- pressure/volume changes push air out of the lungs
- the diaphragm can put additional pressure on the lungs to increase emptying of the lungs.

.....

 **[6]**

(c) (i) Name the part of the brain which controls breathing.

One mark for an identification. **One** required.

- Medulla (oblongata).

[1]

(ii) Identify **one** other process that is controlled by this part of the brain.

One mark for an identification. **One** required.

One other process controlled by this part of the brain:

- heart rhythm/rate
- blood pressure/vasoconstriction
- swallowing
- digestion.

[1]

Mark Scheme Guidance

Question 5(b):

Content	Levels of response
<p>This is a levels of response question – marks are awarded on the quality of the response given. The focus of the question is explanation.</p> <p>Annotation: The number of ticks will not necessarily correspond to the marks awarded.</p> <p>Level 3 – checklist</p> <ul style="list-style-type: none"> • detailed explanation • clear and logically structured • role of pleural membranes must be mentioned • correct nomenclature for full marks • factually accurate • correct use of terminology • QWC – high <p>Level 2 – checklist</p> <ul style="list-style-type: none"> • sound explanation • mostly factually accurate • mostly relevant information • some correct terminology • QWC – mid <p>Level 1 – checklist</p> <ul style="list-style-type: none"> • basic explanation • information may not be relevant • limited structure may be list like/muddled • minimal use of terminology • QWC – low <p>No credit for “route map” or description of gaseous exchange.</p>	<p>Level 3 [5–6 marks]</p> <p>Answers provide a fully detailed explanation of how breathing occurs, including the role of the pleural membranes. For full marks the correct nomenclature should be used. Sentences and paragraphs are relevant and follow a logical sequence with accurate use of appropriate terminology. There will be few errors, if any, of grammar, punctuation and spelling.</p> <p>Level 2 (3–4 marks)</p> <p>Answers provide an explanation of how breathing occurs that includes some use of accurate terminology. Answers are presented with some structure and include relevant information. There may be some errors of grammar, punctuation and spelling.</p> <p>Level 1 [1–2 marks]</p> <p>Answers provide a limited explanation of how breathing occurs. Use of appropriate terminology may be limited. Sentences and paragraphs are not always relevant, with the material presented in a way that does not always address the question.</p> <p>0 marks – response not worthy of credit.</p>

Question 5(c)(i):

Annotation:

The number of ticks must match the number of marks awarded.

For **incorrect** answers use the **cross**.

Question 5(c)(ii):

The number of ticks must match the number of marks awarded.

For **incorrect** answers use the **cross**.

Allow vomiting sneezing and coughing.

Examiner comments

Question 5(b) – Part (b) proved a good discriminator. Some candidates wrote about gaseous exchange rather than the mechanism of breathing. Many candidates were able to link the movements of the ribcage and diaphragm to inspiration and expiration, although many seemed to think that it was the lungs expanding or contracting which caused these parts to move, thereby limiting the marks that could be awarded.

Questions 5(c)(i) and (ii) – The correct part of the brain was well known, as was another function of the medulla.

Exemplar candidate work

Question 5(b) – Low level answer

(b)* Explain how breathing takes place.

Your answer should refer to some of the labelled parts of the diagram.

You firstly breath in oxygen through your nasal cavity which then flows ~~thru~~ down your trachea then your two Bronchi which leads to your bronchioles which have Alveoli sacs at the right end of them. These Alveoli sacs are covered in capillaries - which are one cell thick making it ideal for gaseous exchange. When inspiring takes place the Alveoli sacs fill up with oxygen making your diaphragm flatten and chest wall go up and out. The oxygen diffuses through the thin capillary walls ^{into our blood} and exchanges with having CO₂ - carbon dioxide flow into the ~~alveoli sacs~~ moist Alveoli sacs in order to leave our body through the same system. Here the diaphragm relaxes and chest wall goes down and in, ~~increasing~~ decreasing lung size. [6]

Commentary

The majority of this answer relates to gaseous exchange, which is not relevant for this question.

The candidate appears to suggest that it is the lungs filling with oxygen which causes the diaphragm to move. This “cart before the horse” approach is common in lower level answers.

No credit was given for describing the route through the upper respiratory tract.

To raise this answer into a medium level, the roles of the intercostal muscle and diaphragm muscle should be explicitly described.

Exemplar candidate work

Question 5(b) – Medium level answer

(b)* Explain how breathing takes place.

Your answer should refer to some of the labelled parts of the diagram.

Breathing takes place with two methods.
~~One~~^{one} method is called inspiration.
 this is the process where you breathe in.
 your diaphragm goes downwards meaning
 the pressure to your lungs decreases
 meaning that more air can come in.
 The other process is called ~~exp~~ expiration.
 this is when ~~the~~ you breathe out,
 your diaphragm ~~relax~~ ~~relaxs~~ relaxes.
 meaning that the pressure to
 your lungs increases meaning
 less air should come in.

[6]

Commentary

This answer described both inspiration and expiration in relation to the muscular action of the diaphragm and the resultant pressure changes in the chest. Although no other muscles have been mentioned, this is just sufficient for a medium level mark.

To achieve a higher level mark, the answer would benefit from a comparison between internal and atmospheric pressures, and the resultant effect on the lungs.

Exemplar candidate work

Question 5(b) – High level answer

(b)* Explain how breathing takes place.

Your answer should refer to some of the labelled parts of the diagram.

During inspiration our ^{chest,} ribcages move upwards and outwards, our ~~diaphragm~~ diaphragm moves downwards and there is increased air volume in our lungs.

During expiration our chest and ribcages move inwards and downwards, our diaphragm moves back up and the increased air pressure in our lungs forces the air out through the trachea and out through our mouth.

[6]

Commentary

This high level answer clearly links movement of the ribcage and diaphragm to pressure changes and thus gains a higher level mark.

The answer could be improved by linking muscular contraction and relaxation to the movements.

Question 5(d)

(d) (i) Identify a respiratory malfunction.

One mark for an identification. **One** required.

One from the following:

- Asthma
- Emphysema
- Cystic fibrosis.

[1]

(ii)* Evaluate the possible methods of monitoring and treatment available for the respiratory malfunction in (d)(i).

Evaluate the methods of monitoring and treatment.

Emphysema:

Treatment aims to stabilise the condition and prevent complications.

Lung function tests/chest x-ray/CT scan.

Inhalers/nebulisers (bronchodilators) – widen the airways and make breathing easier.

- Corticosteroid drugs
- Oxygen therapy
- Chest drain
- Antibiotics to treat bacterial infection
- Quit smoking
- Healthy diet
- Exercise
- Drinking lots of water
- Avoid cold air

Cystic Fibrosis:

- No cure, but a range of treatments can help control the symptoms – this can help make the condition easier to live with
- Regular appointments to monitor the condition
- Different medicines needed to treat and prevent lung problems
- Antibiotics to prevent and treat chest infections
- Medicines to make the mucus in the lungs thinner and easier to cough up
- Bronchodilators – widen the airways and make breathing easier
- Steroid medicine to treat small growths inside the nose
- Exercise can help
- Physiotherapy/vibrating jackets
- Airway clearance techniques
- Healthy diet
- Lung transplant (in severe cases)
- Monitoring by lung function tests and bacterial assays

Asthma:

- Monitoring by peak flow or spirometry (unusually)
- Regular checks with GP/asthma nurse
- Use of a reliever inhaler – fast acting – gives immediate effect – relaxes muscles of bronchi
- Use of a preventer inhaler – must be used regularly for best effect – may keep individual symptom-free – reduces inflammation, reduces sensitivity of airways
- Inhalers must be used correctly – many have poor technique – can be difficult for young children

[5]

- Steroid or other medication may be required if inhalers fail or during a flare-up – have side effects so best avoided
- Use of spacer with inhaler improves uptake of drug
- Inhalers portable, unobtrusive
- Use of nebuliser improves uptake of drug
- Awareness of triggers and avoidance where possible may reduce symptoms – may be unable to avoid some things e.g. weather conditions
- Attend check-ups regularly – may be a nuisance – may get deterioration if not done
- Flu jab annually – gives some protection – don't like being "labelled" as at risk
- Exercise regularly as recommended – some afraid – some use their asthma as an excuse for low activity
- Keep weight within healthy limits – reduces risk of increased attacks – may be tempted to "comfort eat" because of diagnosis
- In general, most asthmatics can lead a full and active life helped by medication.

Accept any other relevant point.

Mark Scheme Guidance

Question 5(d)(i):

Annotation:

The number of ticks must match the number of marks awarded.

For **incorrect** answers use the **cross**.

Question 5(d)(ii):

Content	Levels of response
<p>This is a levels of response question – marks are awarded on the quality of the response given. The focus of the question is evaluation.</p> <p>Annotation: The number of ticks will not necessarily correspond to the marks awarded.</p> <p>Level 2 – checklist</p> <ul style="list-style-type: none"> • sound evaluation • mostly factually accurate • mostly relevant information • some correct use of terminology • QWC – mid <p>Level 1 – checklist</p> <ul style="list-style-type: none"> • limited/basic evaluation • information may not be relevant • limited structure may be list like/muddled • minimal use of terminology • QWC – low 	<p>Level 2 (4–5 marks)</p> <p>Answers will provide an evaluation of the monitoring and treatment for their chosen dysfunction. One treatment will be evaluated well at upper end of this level. Answers will be factually accurate, presented with some structure and use appropriate terminology. There may be some errors of grammar, punctuation and spelling.</p> <p>Sub-max of 3</p> <p>If no qualitative judgements about treatment given e.g. quitting smoking most important single treatment and slows progress</p> <p>Level 1 [1–3 marks]</p> <p>Answers provide a limited (or no) evaluation of the monitoring or treatment for their chosen dysfunction but may simply identify or describe. Answers may be list like or muddled and demonstrate little knowledge or understanding. Errors of grammar and spelling may be noticeable and intrusive.</p> <p>0 marks – response not worthy of credit.</p> <p>Accept "asthma pump" instead of inhaler.</p> <p>Credit (1 mark) for saying there are two different types of inhaler.</p>

Examiner comments

Question 5(d)(i) – Almost all candidates were able to identify a respiratory malfunction, with most choosing asthma.

Question 5(d)(ii) – Despite the fact that candidates had been able to select which dysfunction they wished to describe, a good number knew only the most superficial facts. Those describing asthma almost universally knew that two different inhalers might be required as treatment. However many could only differentiate between them by their colour and not by any biological action. Equally the monitoring by peak flow meter, which was usually mentioned, was poorly understood.

Exemplar candidate work

Question 5(d)(ii) – High level answer

(ii)* Evaluate the possible methods of monitoring and treatment available for the respiratory malfunction in (d)(i).

One method used to monitor asthma is peak flow tests. This is used to look at someone's air-flow to see if it is strong enough. If an individual has a low peak flow then it could mean their asthma is getting worse and causing them more respiratory problems. Another method of monitoring is regular check ups with the asthma nurse. This means that if an individual has asthma then the nurse can monitor the symptoms to ensure ~~individual~~ individual is staying healthy and not ~~decreasing~~ worsening. One treatment available for asthma is inhalers. There are two types of inhalers which are reliever inhalers and preventer inhalers. *continued on additional paper. [5]

5(d)(ii) -

Relievers inhalers are blue, and they are used ~~to~~ when you have an asthma attack and have trouble breathing. They reduce symptoms. Preventer inhalers are ~~used~~ usually brown but can be purple and they are used every day to reduce inflammation in the bronchus and bronchioles. Another treatment for asthma is to avoid possible triggers such as stress, dust ^{and} cigarettes. This can be done but making lifestyle changes which can include reducing your workload to avoid stress, getting rid of animals if they shed fur and also keeping your home clean to avoid any dust.

Commentary

The candidate correctly identified peak flow tests as part of the monitoring process. The description of this as seeing if the airflow is "strong enough" is just about adequate insofar as relating a low peak flow to the worsening of asthma is correct. The following section about check-ups with an asthma nurse is repetitive and gains nothing.

When moving on to deal with treatment, the candidate correctly identifies the use of two kinds of inhalers. Mention of the colour of the inhalers and a description of when each should be used gain no further credit.

Talk of inhalers "reducing symptoms" is far too vague. Credit is given for noting that preventer inhalers reduce inflammation. Avoidance of triggers with examples is also correct. Finally the mention of lifestyle changes such as stress reduction is correct.

The answer could have been improved by giving more precise information about the exact effects of the two types of inhaler within the body. There was a great deal of repetition within the answer. Full marks could have been gained with far less content and greater precision.



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