



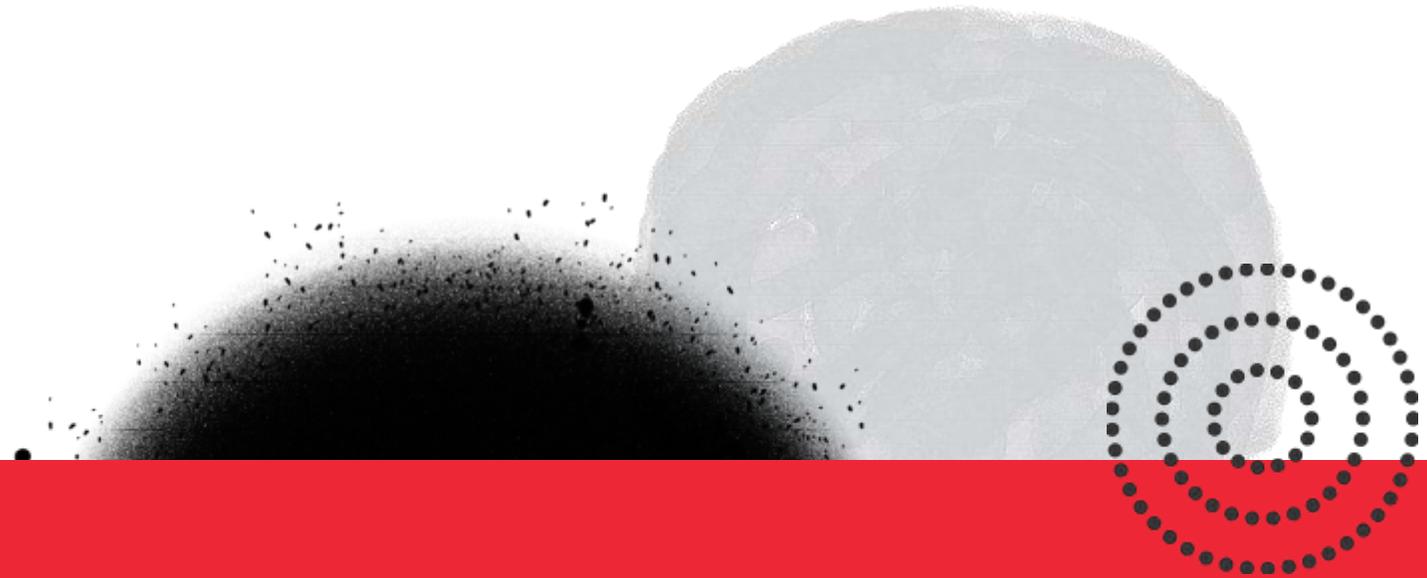
LIFE SCIENCES

**SUMMARY &
TEACHING TOOL**



NATIONAL SENIOR CERTIFICATE 2022

DIAGNOSTIC REPORT



2022 LIFE SCIENCES NSC PAPER 1

Life Sciences Paper 1

SUMMARY & TEACHING TOOL

Let's work through the paper and look at the problem areas as identified in the 2022 NSC Diagnostic Report.

Commentary from the Diagnostic Report is noted in grey blocks like the one below. Use these to guide discussions.

Candidates confused the pupillary mechanism and accommodation.

In some cases, revision or application options will be provided and can be identified by this symbol:



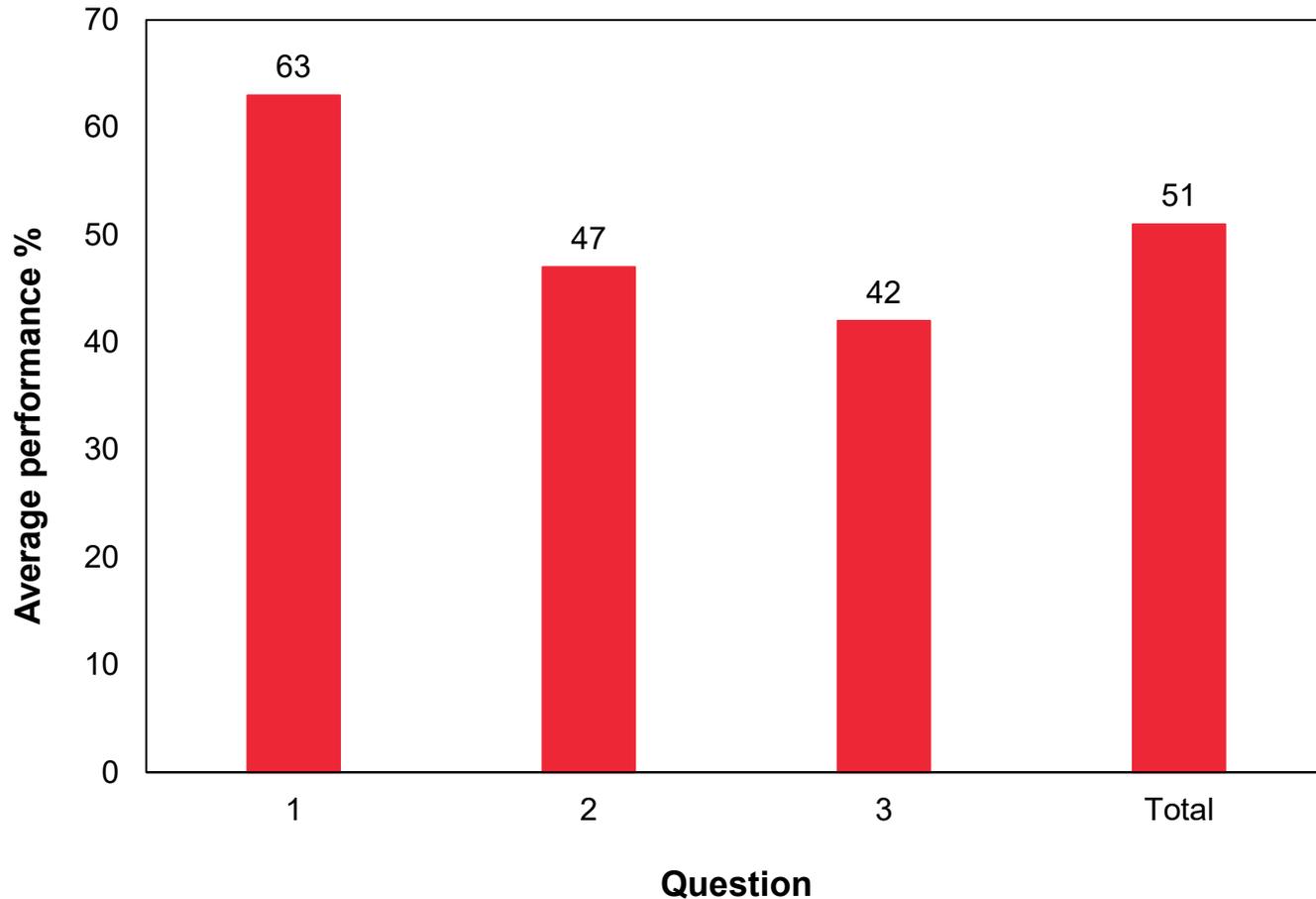
Let's revise this

Click to go to the specific section.



2022 LIFE SCIENCES NSC PAPER 1

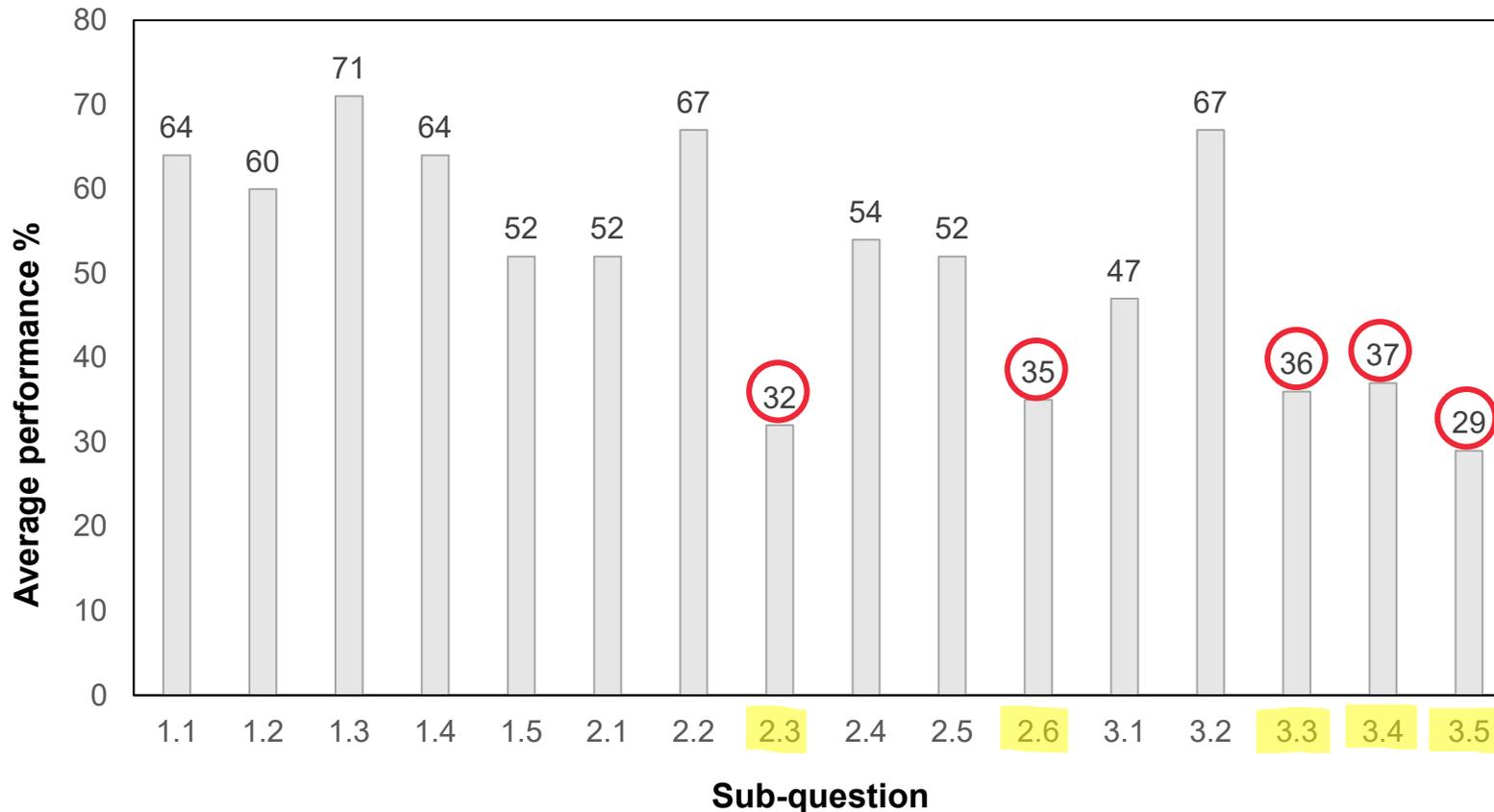
Average performance **per question**



Question	Topics
1	Multiple choice, Terminology, Matching Items, Receptors – the human eye, negative feedback mechanism (thyroxin)
2	Male reproductive system, gametogenesis - sperm, menstrual cycle, reproductive strategies, homeostasis - negative feedback mechanism (glucose)
3	Brain, receptors - the human ear, scientific investigation and plant responses to the environment

2022 LIFE SCIENCES NSC PAPER 1

Average performance **per sub-question**



Problem areas

- 2.3 Menstrual cycle – FSH and LH
- 2.6 Homeostasis of blood glucose
- 3.3 Receptors – the human ear
- 3.4 Scientific investigation – homeostasis
- 3.5 Plant responses

2022 LIFE SCIENCES NSC PAPER 1

General Comments

! Correct **spelling** is very important

- *glucagon vs glycogen*
- *chorion vs chorionic*
- *uterus vs ureter*

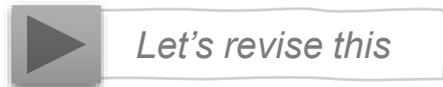
! Pay more attention to **disorders of human physiology**

- *goitre*
- *diabetes mellitus*
- *spinal cord injuries*
- *middle-ear infections & grommets*



! Emphasise difference between commonly **confused terms**

- *sperm vs semen*
- *egg vs ovum*
- *uterine wall vs uterine lining*
- *corpus callosum vs corpus luteum*
- *amnion vs amniotic fluid*



! **Scientific investigations** still require attention

- *do not give generic answers, e.g. a large sample size was used*
- *give specific information for the investigation provided, e.g. a large sample of 150 volunteers/participants was used*

! **Don't memorise the memoranda** of past papers

- *scenarios differ each year*
- *respond appropriately to the question in front of you*

SECTION A – Multiple Choice

1.1.1 Which ONE of the following maintains the shape of the eyeball?

- A Cornea
- B Lens
- C Vitreous humour
- D Retina

*Grade 12 Life Sciences
Part 1 p. 55*

1.1.2 The choroid ...

- A is richly supplied with blood vessels.
- B contains photoreceptors.
- C refracts the light rays.
- D sends impulses to the brain.

*Grade 12 Life Sciences
Part 1 p. 55*

1.1.3 Which ONE of the following occurs immediately after fertilisation?

- A The blastula, which is a hollow ball of cells, is formed by meiosis.
- B The morula, which is a hollow ball of cells, is formed by meiosis.
- C The blastula, which is a solid ball of cells, is formed by mitosis.
- D The morula, which is a solid ball of cells, is formed by mitosis.

*Grade 12 Life Sciences
Part 1 p. 24*

1.1.4 On a hot day ...

- A less blood flows to the surface of the skin.
- B the sweat glands become inactive.
- C more blood flows to the surface of the skin.
- D vasoconstriction takes place.

*Grade 12 Life Sciences
Part 1 p. 87*

1.1.5 The normal site of fertilisation in a human female is the ...

- A uterus.
- B ovary.
- C vagina.
- D Fallopian tube.

*Grade 12 Life Sciences
Part 1 p. 14*

SECTION A – Multiple Choice

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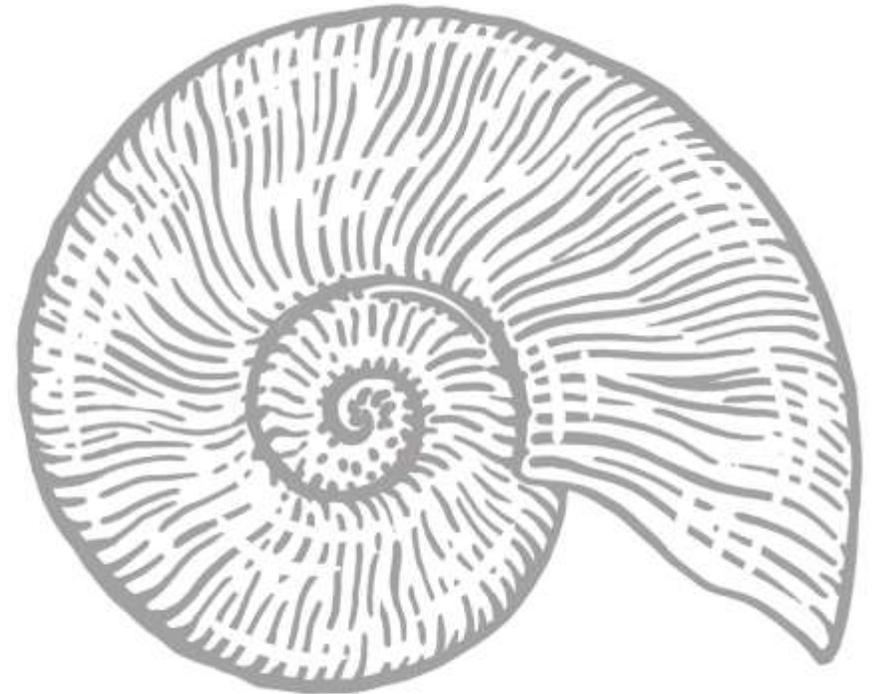
SECTION A – Tricky Multiple Choice

1.1.6

Which ONE of the following best describes the events of accommodation when a person is viewing an object that is less than 6 m away?

	Ciliary muscle	Suspensory ligaments	Tension on the lens
A	Relaxes	Tighten	Increases
B	Contracts	Slacken	Decreases
C	Relaxes	Slacken	Decreases
D	Contracts	Tighten	Increases

*Grade 12 Life Sciences
Part 1 p. 59*



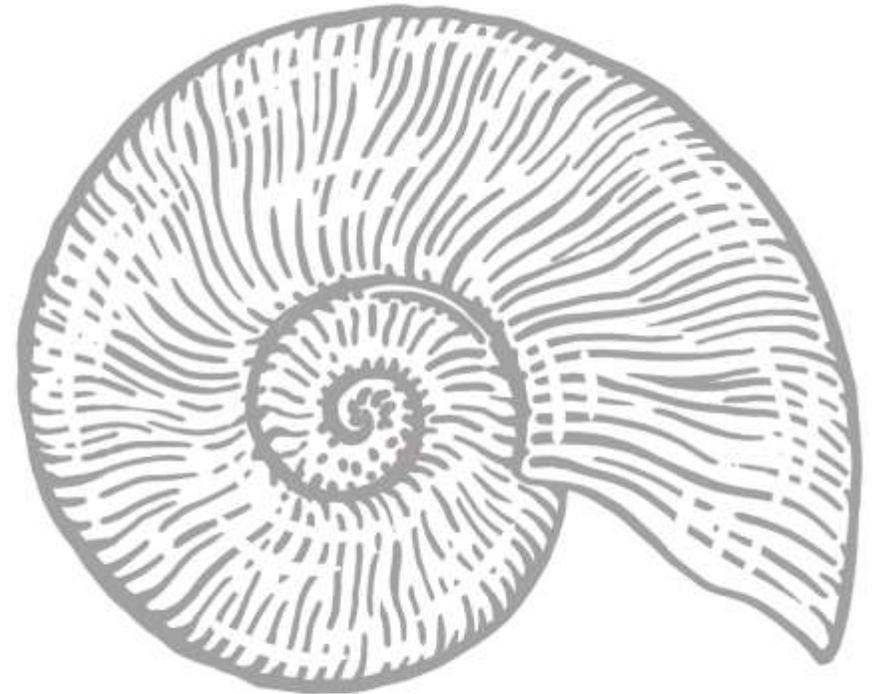
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Candidates confused the 'pupillary mechanism' and 'accommodation'.



SECTION A – Multiple Choice

QUESTIONS 1.1.7 AND 1.1.8 ARE BASED ON THE DIAGRAM OF THE NEURON.

1.1.7

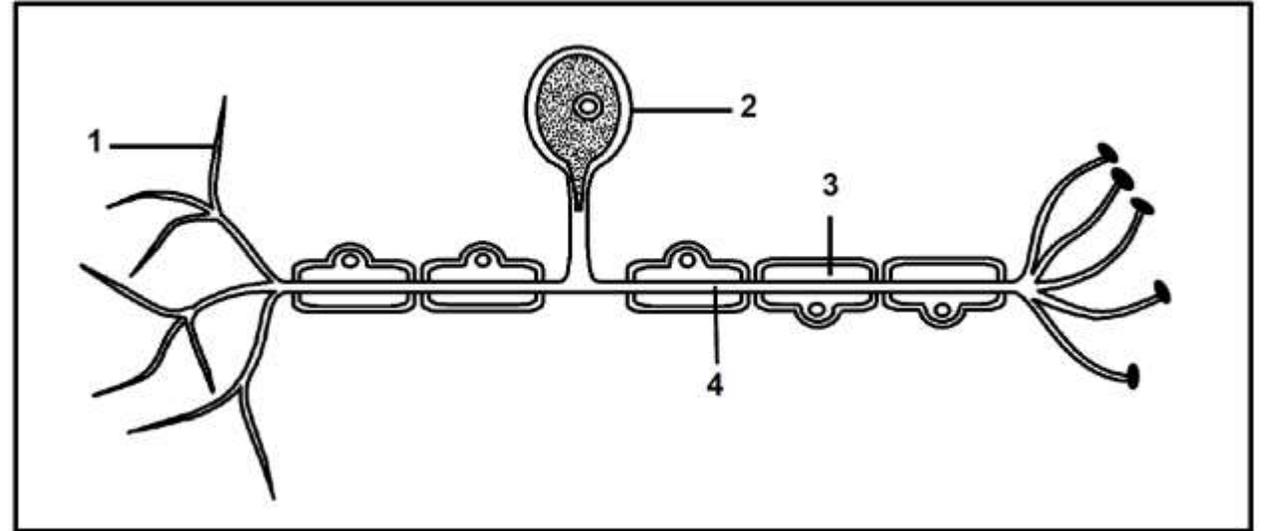
The axon is represented by structure ...

- A 1
- B 2
- C 3
- D 4

1.1.8

Which labelled part affects the speed of the impulse transmission?

- A 1
- B 2
- C 3
- D 4



Grade 12 Life Sciences
Part 1 p. 34

SECTION A – Multiple Choice

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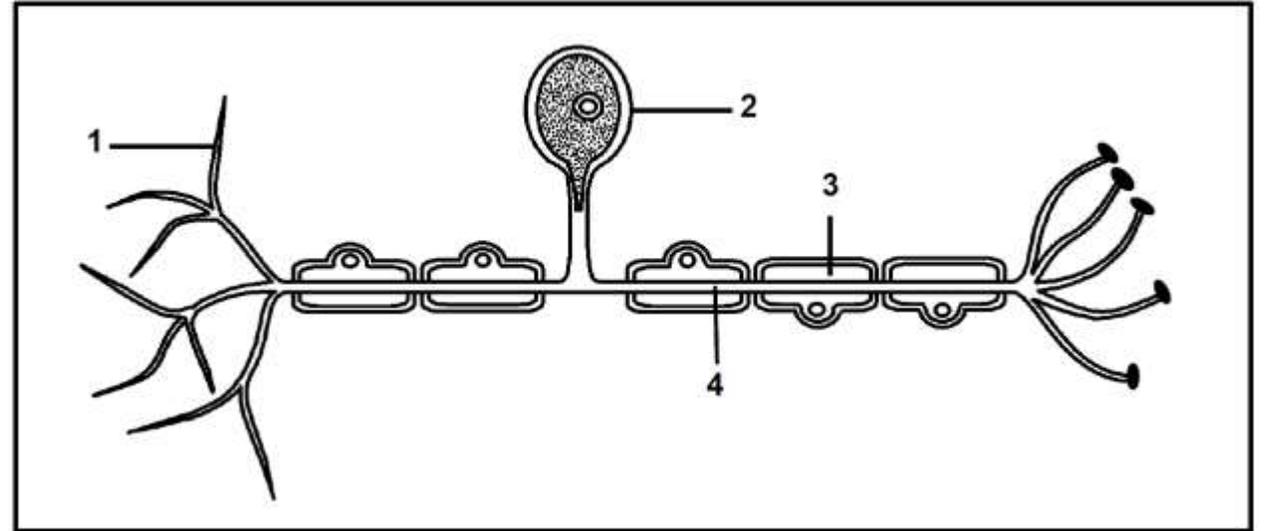
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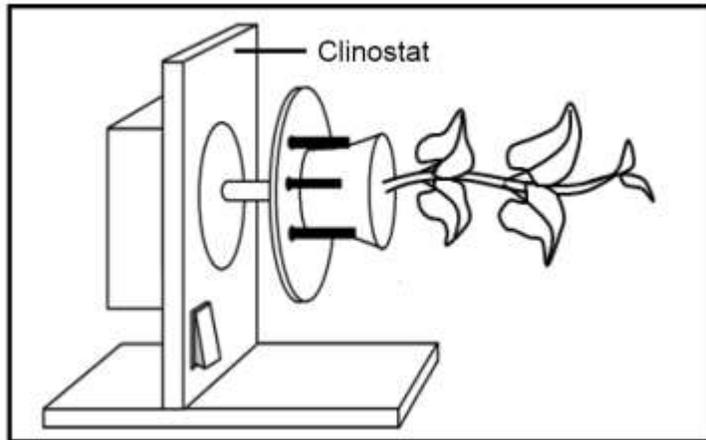
SECTION A – Tricky Multiple Choice

QUESTIONS 1.1.9 AND 1.1.10 REFERS TO THE INVESTIGATION BELOW TO DETERMINE THE EFFECT OF AUXINS ON TROPISM

Refer to the diagram below that shows an investigation done to determine the effect of auxins on tropism. The procedure was as follows:

- A pot plant was placed on a stationary clinostat.
- The plant was exposed to light from all directions.
- The growth was observed after a few days.

The diagram below shows the set-up for the investigation.



The results after a few days showed the stem growing upwards.

1.1.9

Which ONE of the following is an explanation of the results?

- A Phototropism occurred because the auxins moved towards light, which inhibited growth on the lower side of the stem.
- B Geotropism occurred because the auxins moved downwards, which stimulated growth on the lower side of the stem.
- C Phototropism occurred because the auxins moved away from light, which stimulated growth on the upper side of the stem.
- D Geotropism occurred because the auxins moved upwards, which inhibited growth on the upper side of the stem.

1.1.10

A control for the same investigation was set up by putting an identical pot plant on a **rotating** clinostat.

Which ONE of the following would be the expected results observed after a few days?

- A There will be no growth.
- B The stem will grow upwards.
- C The stem will grow downwards.
- D The stem will grow horizontally.

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Part 1 p. 91-92

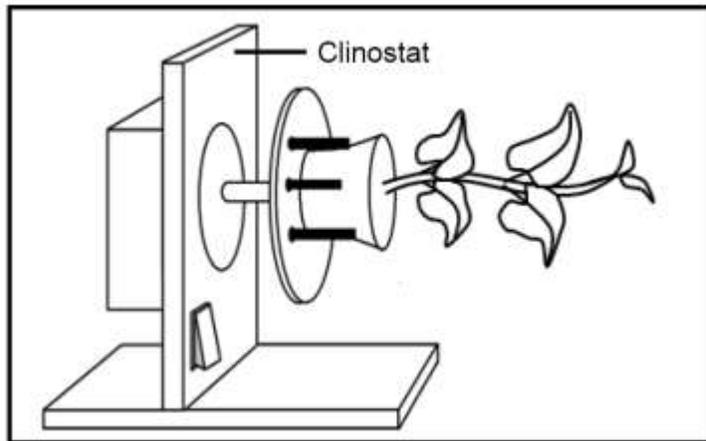
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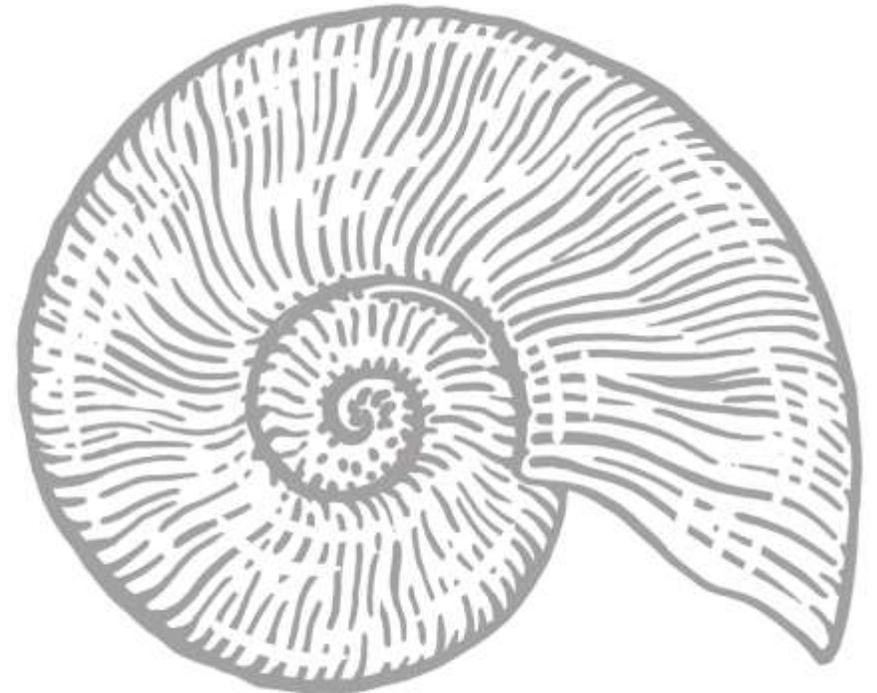
- A There will be no growth.
- B The stem will grow upwards.
- C The stem will grow downwards.
- D The stem will grow horizontally.

Candidates had difficulty applying their knowledge of auxins to geotropism rather than phototropism.

SECTION A – Terminology

Give the correct **biological term** for each of the following descriptions. Write only the term next to the question number (1.2.1 to 1.2.10) in the ANSWER BOOK.

- 1.2.1 The part of the skull that protects the brain.
- 1.2.2 The homeostatic process whereby temperature is controlled in the body.
- 1.2.3 The visual defect characterized by a cloudy lens.
- 1.2.4 The blood vessel that transports deoxygenated blood from the foetus towards the placenta.
- 1.2.5 The part of the brain that controls body temperature.
- 1.2.6 A branch of the nervous system that is made up of spinal and cranial nerves.
- 1.2.7 Finger-like projections that develop from the outer membrane of an embryo after implantation.
- 1.2.8 A hormone that regulates the salt levels in the blood.
- 1.2.9 The fluid that protects the developing foetus against mechanical injury.
- 1.2.10 The area of the retina that contains the highest concentration of cones.



SECTION A – Terminology

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- 1.2.9 The fluid that protects the developing foetus against mechanical injury.
- 1.2.10 The area of the retina that contains the highest concentration of cones.

Memorandum

cranium ✓

thermoregulation ✓

cataract ✓

umbilical artery ✓

hypothalamus ✓

peripheral ✓ nervous system

chorionic villi ✓

aldosterone ✓

amniotic ✓ fluid

fovea centralis ✓ /
yellow spot

Common misconceptions & Errors

Provided *umbilical cord* ✗

Provided abbreviation *PNS* ✗

Provided *chronic villi* ✗

Provided *amnion fluid* ✗

SECTION A – Item/statement columns

Indicate whether each of the descriptions in COLUMN I apply to **A ONLY**, **B ONLY**, **BOTH A AND B** or **NONE** of the items in COLUMN II. Write **A only**, **B only**, **both A and B** or **none** next to the question number (1.3.1 to 1.3.3) in the ANSWER BOOK.

	COLUMN I	COLUMN II
1.3.1	A plant hormone that inhibits the germination of seeds	A: Gibberellins B: Abscisic acid
1.3.2	The functional connection between two consecutive neurons	A: Synapse B: Effector
1.3.3	A hormone that stimulates puberty	A: Testosterone B: Oestrogen

Grade 12 Life Sciences Part 1 p. 94

Grade 12 Life Sciences Part 1 p. 35

Grade 12 Life Sciences Part 1 p. 15



SECTION A – Item/statement columns

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1.3.2 The functional connection between two consecutive neurons	A: Synapse B: Effector
1.3.3 A hormone that stimulates puberty	A: Testosterone B: Oestrogen

Memorandum

B only ✓✓

A only ✓✓

Both A and B ✓✓

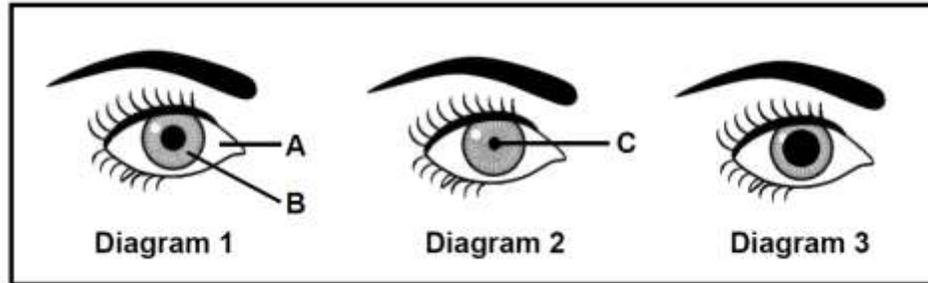
Common misconceptions & Errors

1.3.3 Candidates selected NONE as the option. Although hormones like GnRH and FSH initiate sexual development, both 'testosterone' and 'oestrogen' stimulate changes that are part of puberty.

SECTION A – Sense organs

1.4

The diagrams below show the condition of the eye for different light intensities when viewing the same object.



1.4.1 Give the LETTER and NAME of the part that:

- (a) Contains muscles
- (b) Is made up of tough white fibrous tissue

1.4.2 Which diagram (1, 2 or 3) represents the eye of a person:

- (a) In a very bright area
- (b) Where the rods are stimulated most

1.4.3 Which muscles are:

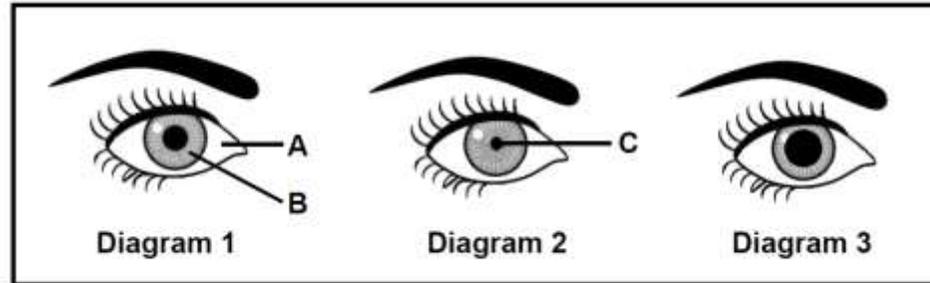
- (a) Contracted in diagram 2
- (b) Relaxed in diagram 3

Common misconceptions & Errors

SECTION A – Sense organs

1.4

The diagrams below show the condition of the eye for different light intensities when viewing the same object.



1.4.1 Give the LETTER and NAME of the part that:

- (a) Contains muscles **B✓ Iris✓ (2)**
- (b) Is made up of tough white fibrous tissue **A✓ Sclera✓ (2)**

1.4.2 Which diagram (1, 2 or 3) represents the eye of a person:

- (a) In a very bright area **2✓ (1)**
- (b) Where the rods are stimulated most **3✓ (1)**

1.4.3 Which muscles are:

- (a) Contracted in diagram 2 **Circular✓ muscles (1)**
- (b) Relaxed in diagram 3 **Circular✓ muscles (1)**

Common misconceptions & Errors

1.4 Candidates confused the 'pupillary mechanism' and 'accommodation'.

1.4.3 (a) and (b) Candidates wrote 'ciliary muscles' instead of 'circular muscles'.

SECTION A – Homeostasis & Endocrine system

1.5

The diagram below shows the interaction between two endocrine glands.

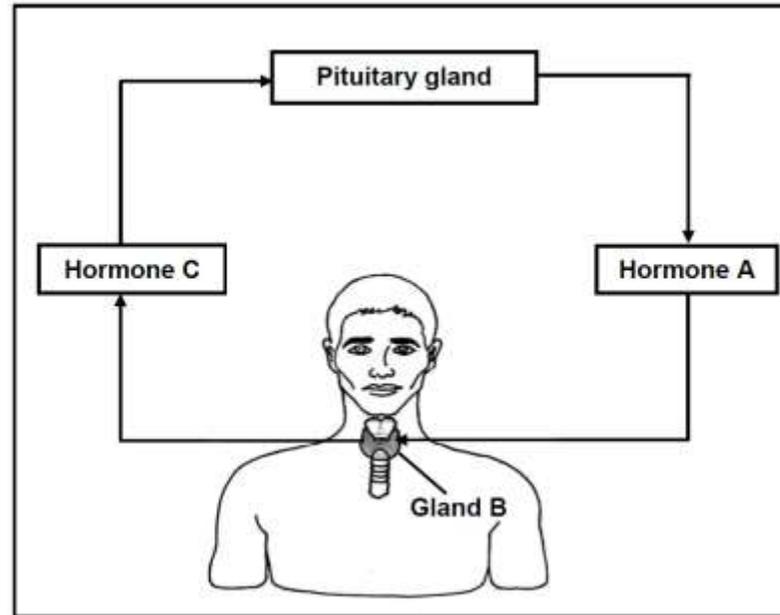
1.5.1 Name the type of interaction that occurs between hormone **A** and gland **B**.

1.5.2 Identify:

- (a) Gland **B**
- (b) Hormone **A**
- (c) Hormone **C**

1.5.3 Name the disorder that results when gland **B** is overstimulated and becomes enlarged.

1.5.4 Which hormone (**A** or **C**) will be expected to be high in the blood of the person with the disorder named in QUESTION 1.5.3?



Common misconceptions & Errors

SECTION A – Homeostasis & Endocrine system

1.5

The diagram below shows the interaction between two endocrine glands.

1.5.1 Name the type of interaction that occurs between hormone **A** and gland **B**.

Negative feedback ✓
mechanism (1)

1.5.2 Identify:

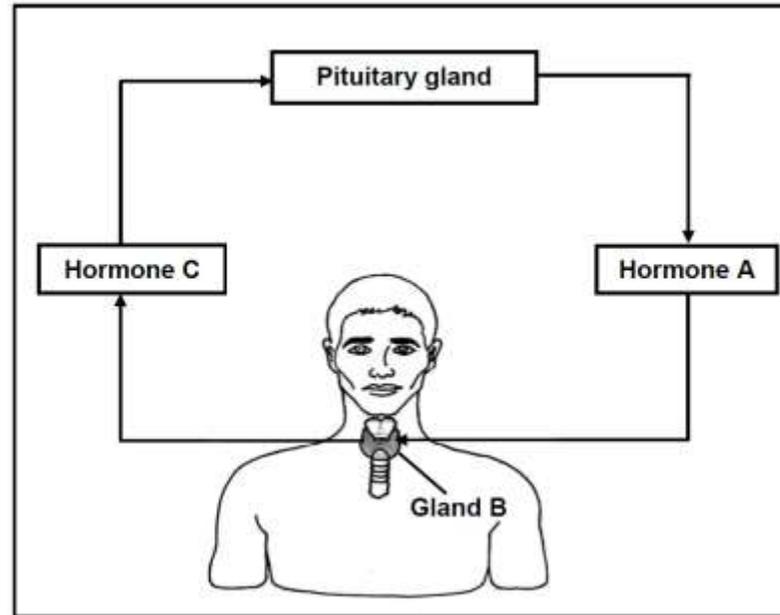
- (a) Gland **B** Thyroid ✓ (1)
- (b) Hormone **A** TSH ✓ (1)
- (c) Hormone **C** Thyroxin ✓ (1)

1.5.3 Name the disorder that results when gland **B** is overstimulated and becomes enlarged.

Goitre ✓ (1)

1.5.4 Which hormone (**A** or **C**) will be expected to be high in the blood of the person with the disorder named in QUESTION 1.5.3?

Hormone **A** ✓ (1)



Common misconceptions & Errors

1.5 Most poorly answered question in Section A.

1.5.3 Goitre is a new inclusion in the revised examination guidelines that was unfamiliar to many candidates

SECTION A – Suggestions for improvement

- ✓ Make sure to write only ONE LETTER in multiple choice questions.
- ✓ Teach overlapping or confusing content (e.g. pupillary mechanism and accommodation) with a side-by-side visual.
- ✓ Practice writing out Biological terminology after each section. Perfect spelling skills.
- ✓ Read questions with proper understanding. One word could change the required response:
 - 'The part that protects the brain' → meninges
 - 'The part of the **skull** that protects the brain' → cranium (Question 1.2.1)
- ✓ Diagrams in exams may differ from ones in study materials. Find the familiar parts and work backwards (e.g. Question 1.5).
- ✓ Focus on content in Examination Guidelines and do not teach unnecessary content (e.g. Grave's disease).

SECTION B – Human reproduction

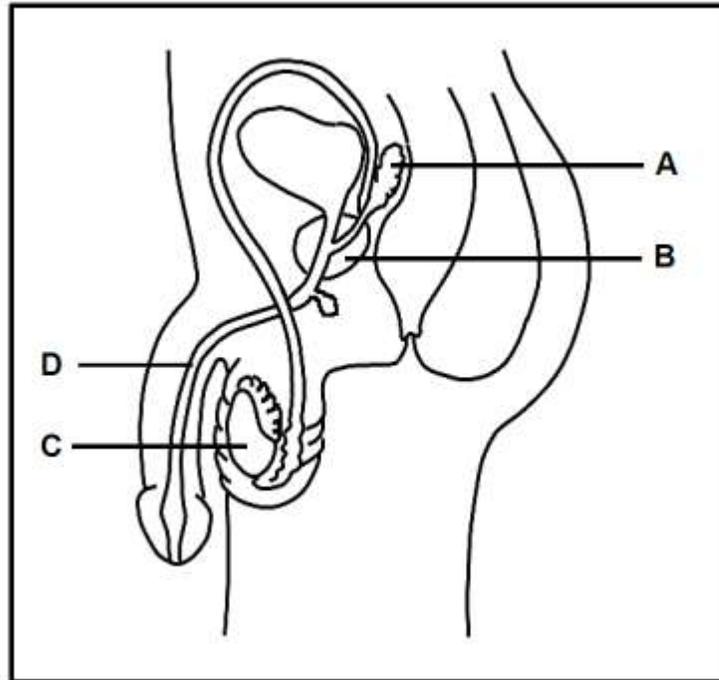
2.1

The diagram below represents the male reproductive system.

2.1.1 Identify structure **A**.

2.1.2 State ONE function of part **D** in reproduction.

2.1.3 Give TWO reasons why structure **B** is NOT considered to be an endocrine gland.



Common misconceptions & Errors

SECTION B – Human reproduction

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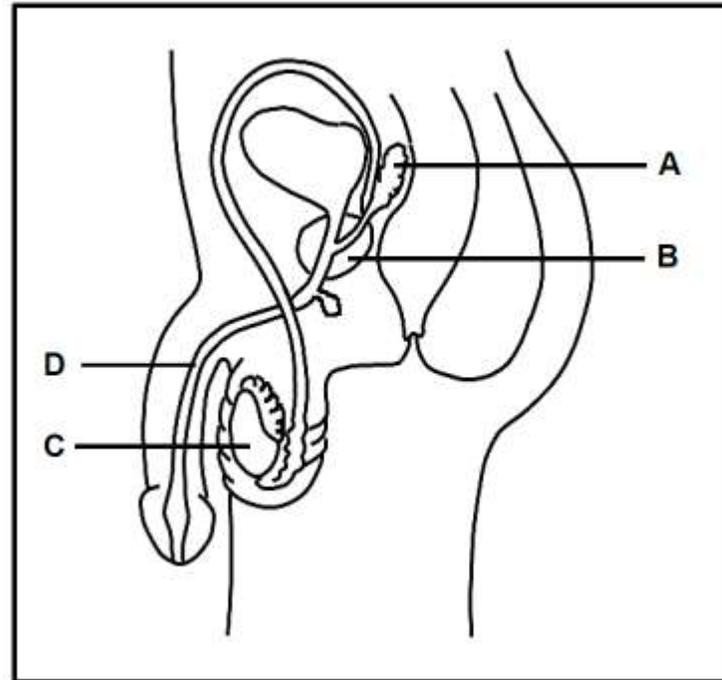
Seminal vesicle ✓ (1)

2.1.2 State ONE function of part **D** in reproduction.

Transports semen out of the body ✓ (first 1 only)

2.1.3 Give TWO reasons why structure **B** is NOT considered to be an endocrine gland.

- Transports its secretions in ducts ✓ / secretion not directly in blood
- Does not produce a hormone ✓ (first 2 only)



Common misconceptions & Errors

2.1 Candidates struggled to identify the male accessory glands in a side-view diagram.

2.1.2 Candidates used the words 'semen' and 'sperm' interchangeably, but there is a distinct difference.

2.1.3 Most candidates could only give ONE reason why structure B was NOT an endocrine gland.

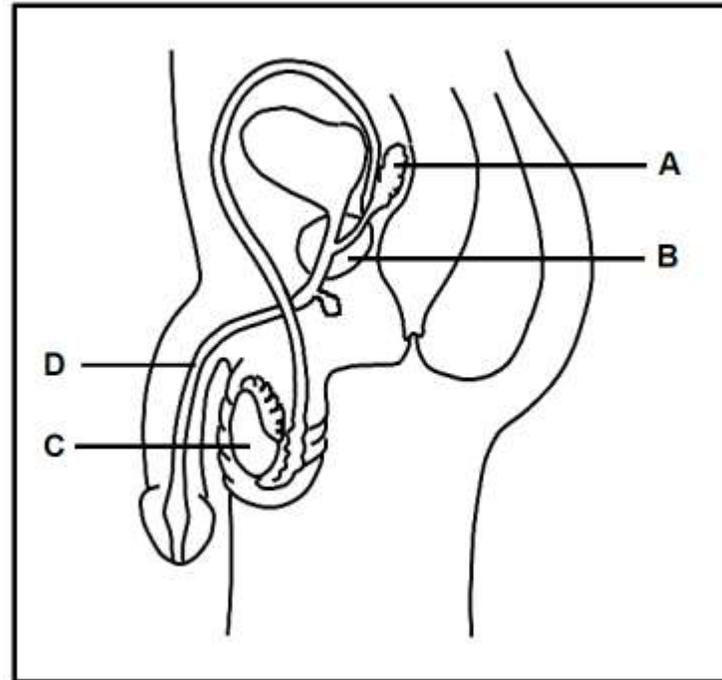
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The diagram below represents the male reproductive system.

2.1.4 Name the type of gametogenesis that occurs in part **C**.

2.1.5 Explain how the secretions of structures **A** and **B** improve the chances of fertilisation.



Common misconceptions & Errors

SECTION B – Human reproduction

2.1

The diagram below represents the male reproductive system.

2.1.4 Name the type of gametogenesis that occurs in part **C**.

Spermatogenesis ✓ (1)

2.1.5 Explain how the secretions of structures **A** and **B** improve the chances of fertilisation.

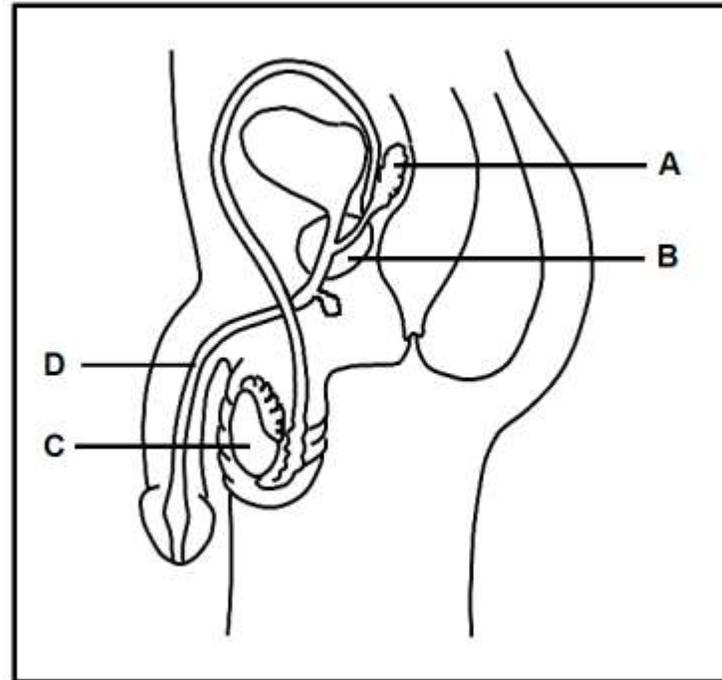
- alkaline ✓ to neutralise the acidity of the vagina ✓

OR

- contains nutrients ✓ for the sperm to generate energy for movement ✓

OR

- is a fluid ✓ which facilitates the movement of the sperm cells ✓ (any 2 x 2)



Common misconceptions & Errors

2.1.5 Candidates lost marks because they only described the secretions and did not explain how they increase the chances of fertilisation.

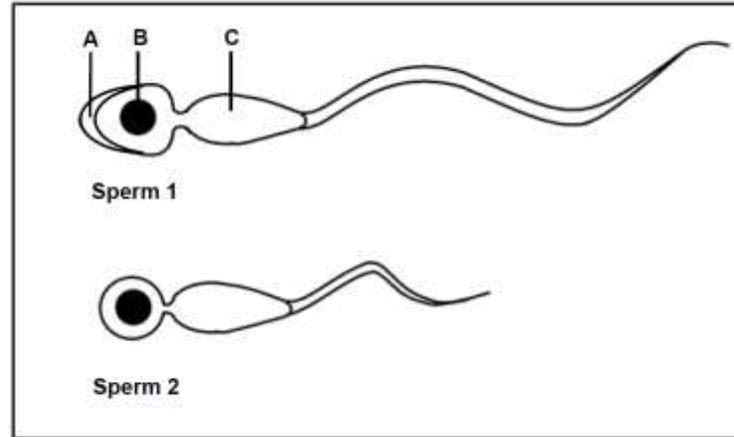
SECTION B – Human reproduction

2.2

The diagrams below show the structure of a normal and an abnormal sperm. (The diagrams are not drawn to scale.)

2.2.1 Identify part **A**.

2.2.2 Describe the role of structure **B** during fertilisation.



2.2.3 Explain the role of the organelles found in large numbers in part **C**.

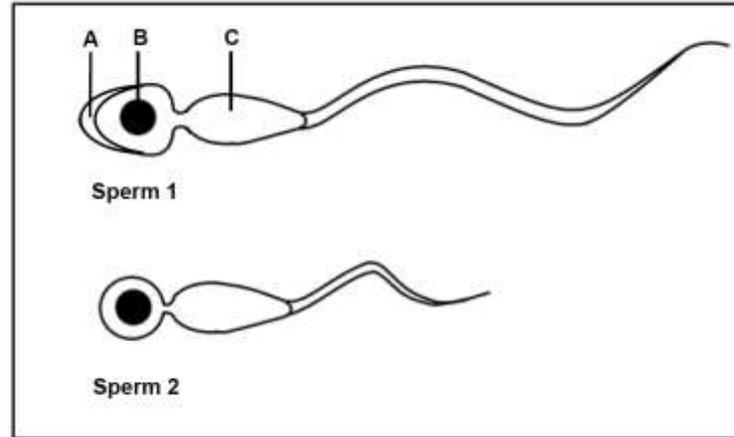
2.2.4 Explain TWO reasons why sperm 1 is structurally better suited for fertilisation than sperm 2.

Common misconceptions & Errors

SECTION B – Human reproduction

2.2

The diagrams below show the structure of a normal and an abnormal sperm. (The diagrams are not drawn to scale.)



2.2.1 Identify part **A**.

Acrosome ✓ (1)

2.2.2 Describe the role of structure **B** during fertilisation.

Fuses with the nucleus of the ovum ✓
Carries the genetic material ✓ (any 1)

2.2.3 Explain the role of the organelles found in large numbers in part **C**.

Produces energy ✓ / site for cellular respiration which is needed for movement ✓ of the sperm (2)

2.2.4 Explain TWO reasons why sperm 1 is structurally better suited for fertilisation than sperm 2.

- torpedo/oval shaped head ✓ facilitates faster movement ✓
- presence of part A ✓ / acrosome enables the sperm to penetrate the ovum ✓
- longer tail ✓ ensures faster movement ✓ (any 2 x 2; mark first TWO only)

Common misconceptions & Errors

2.2.4 Candidates did not understand which structures made sperm cell 1 well-structured for fertilisation.

SECTION B – Human reproduction

2.3

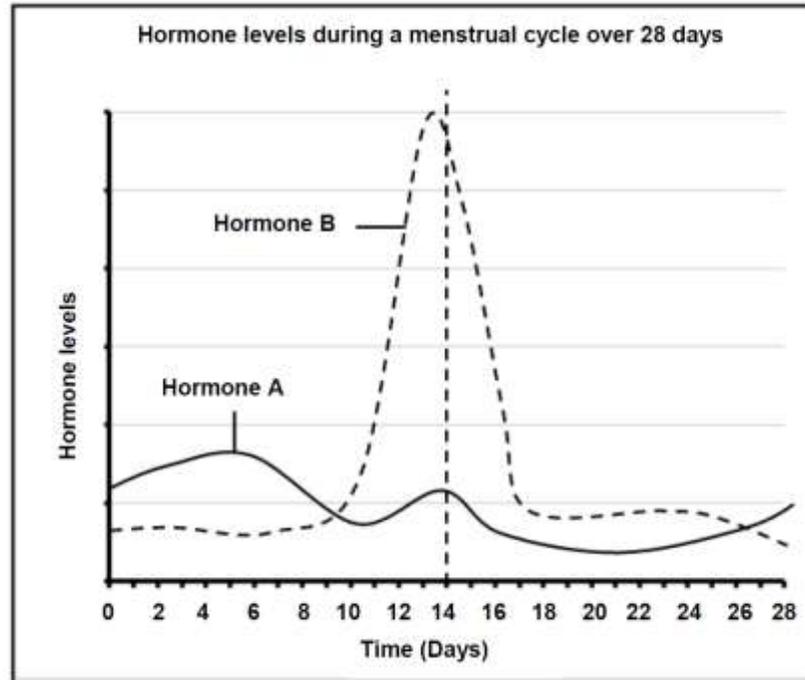
The graph below shows the levels of two hormones that are secreted by the pituitary gland during the menstrual cycle.

2.3.1 State TWO functions of hormone **B**.

2.3.2 Explain why a female who is struggling to get pregnant:

(a) May be given pills containing hormone **A** as a treatment.

(b) Will have her levels of hormone **B** constantly monitored.



Common misconceptions & Errors

SECTION B – Human reproduction

2.3

The graph below shows the levels of two hormones that are secreted by the **pituitary gland** during the menstrual cycle.

2.3.1 State TWO functions of hormone **B**.

- Stimulates ovulation ✓
- Stimulates the development of the corpus luteum ✓ (2)

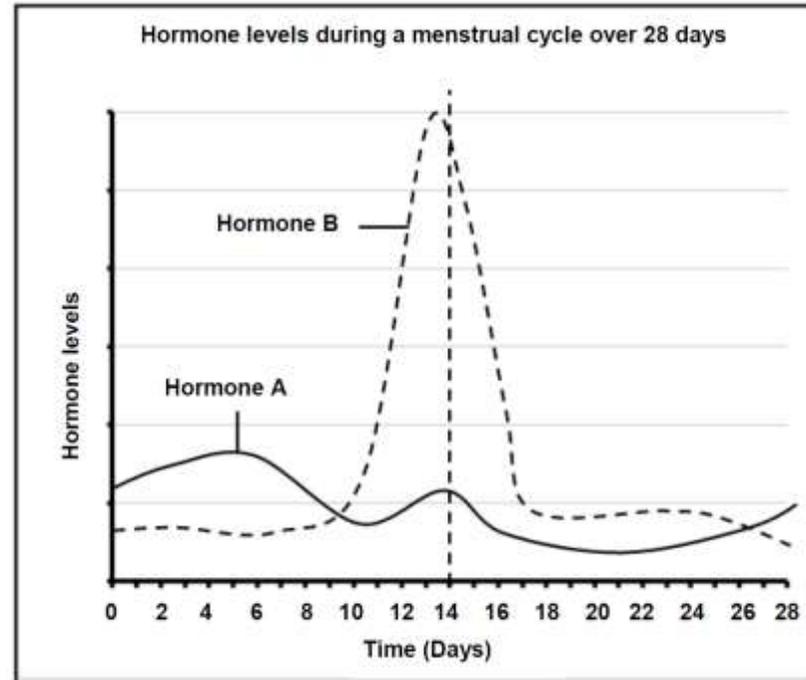
2.3.2 Explain why a female who is struggling to get pregnant:

(a) May be given pills containing hormone **A** as a treatment.

- FSH ✓ / a high concentration of hormone **A** ✓
- will stimulate follicles to develop ✓
- therefore, ova will be produced ✓ increasing the chances to fall pregnant (3)

(b) Will have her levels of hormone **B** constantly monitored.

- a peak in LH ✓ / hormone **B** ✓
- will indicate that ovulation is about to happen ✓
- therefore, an ovum will be available for fertilisation ✓ (any 2)



Common misconceptions & Errors

2.3 Candidates identified hormone A as oestrogen and hormone B as progesterone, because they failed to read the stem of the question ('pituitary gland').

Incorrect identification of the hormones affected ALL the subsequent questions.

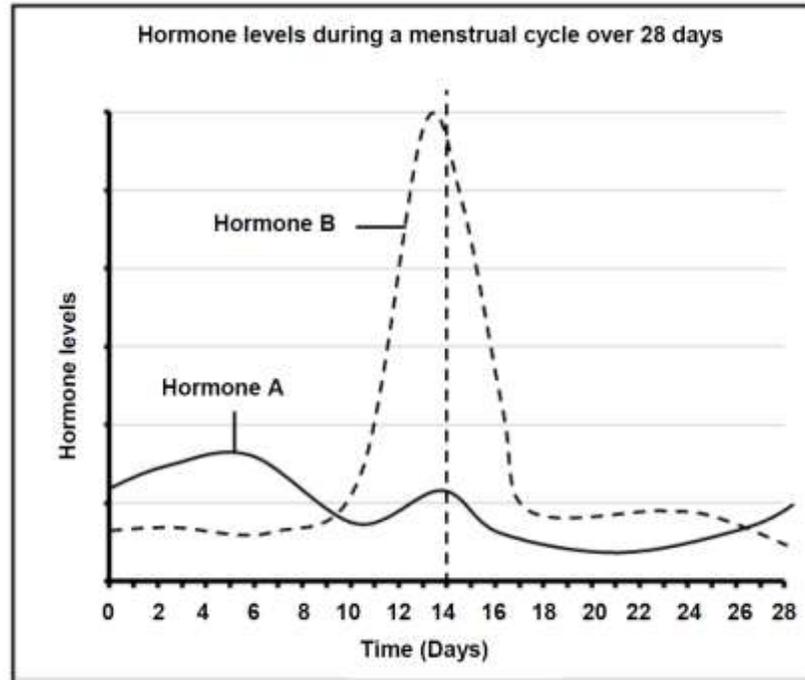
2.3.2 Candidates could not apply their content knowledge to a new scenario.

SECTION B – Human reproduction

2.3

The graph below shows the levels of two hormones that are secreted by the pituitary gland during the menstrual cycle.

2.3.3 Explain how the levels of hormone **A** on days 0 to 5 will differ in a pregnant female.



Common misconceptions & Errors

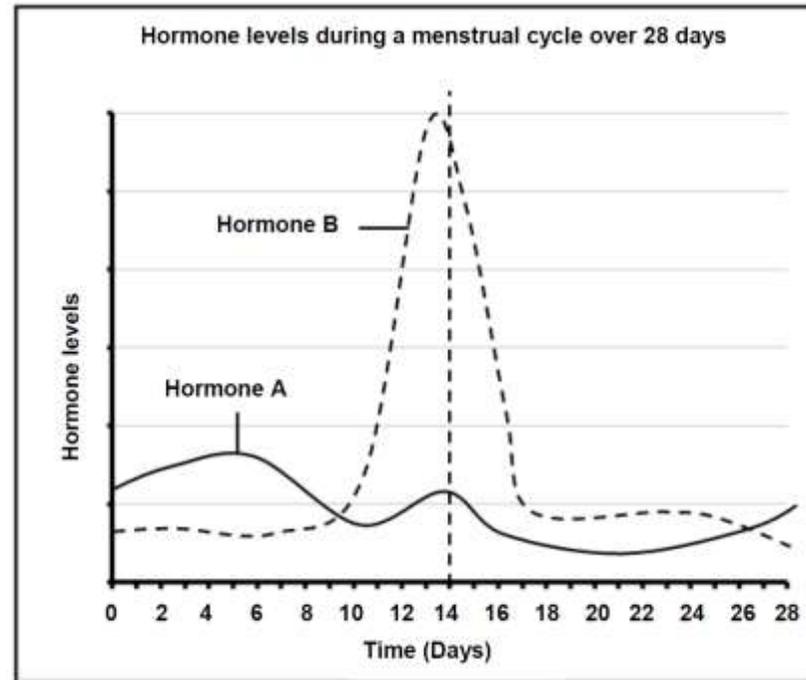
SECTION B – Human reproduction

2.3

The graph below shows the levels of two hormones that are secreted by the pituitary gland during the menstrual cycle.

2.3.3 Explain how the levels of hormone **A** on days 0 to 5 will differ in a pregnant female.

- the levels will remain low ✓ because
- the high progesterone levels ✓ during pregnancy
- will inhibit the secretion of FSH ✓ /hormone A (3)



Common misconceptions & Errors

2.3.3 Candidates could not apply their content knowledge to a new scenario.

SECTION B – Human reproduction

2.4 Describe the secretion of the ovarian hormones and their role in the menstrual cycle.

Common misconceptions & Errors

SECTION B – Human reproduction

2.4 Describe the secretion of the ovarian hormones and their role in the menstrual cycle.

- the Graafian follicle✓
- secretes oestrogen✓
- causing the endometrium to become thicker✓/more glandular or vascular
- the corpus luteum✓
- secretes progesterone✓
- which further increases the thickness of the endometrium✓
- high levels of progesterone inhibit FSH✓ (any 5)

Common misconceptions & Errors

2.4 Candidates' answers fell short of being complete. They were able to identify the ovarian hormones but could not explain their role in the menstrual cycle.

SECTION B – Reproduction in other vertebrates

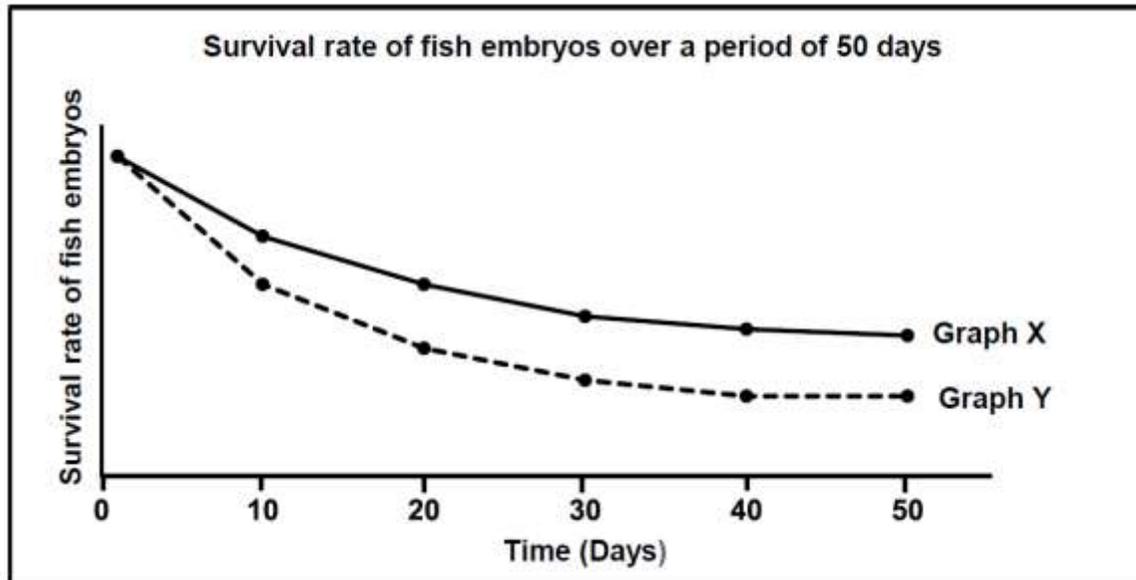
2.5

Read the extract below.

Anchovy is a type of fish found in the Pacific Ocean. During the breeding season, the females and males gather in large groups and release ova and semen into the water. Once fertilised, the eggs float in the water, and embryonic development occurs until hatching.

The northern pike fish is found mainly in rivers. During the breeding season, the female releases thousands of ova and the male releases semen all around the female. The fertilised eggs attach to vegetation near the riverbed, where embryonic development occurs until hatching.

The graph below shows the survival rate of both fish species.



Common misconceptions & Errors

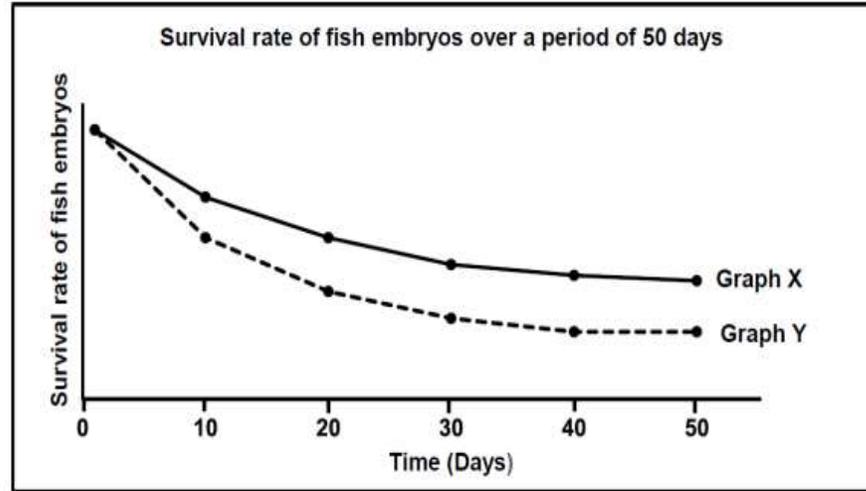
2.5 Classic data-response, higher-order question.

SECTION B – Reproduction in other vertebrates

2.5

2.5.1 Name the type of fertilisation that takes place in both fish species.

2.5.2 Explain why both fish species are oviparous.



2.5.3 Describe TWO ways in which the chances of fertilisation are increased in the northern pike fish.

2.5.4 Which graph (X or Y) represents the survival rate of the northern pike fish?

2.5.5 Explain your answer to QUESTION 2.5.4.

Common misconceptions & Errors

SECTION B – Reproduction in other vertebrates

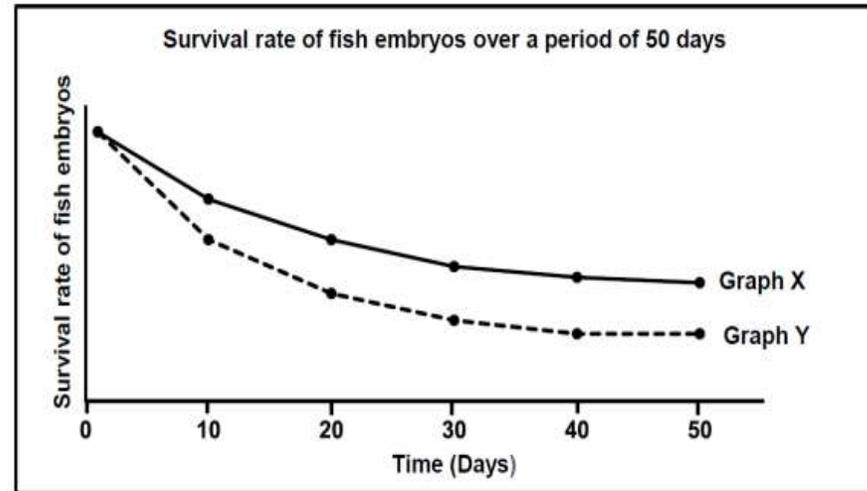
2.5

2.5.1 Name the type of fertilisation that takes place in both fish species.

external ✓ fertilisation (1)

2.5.2 Explain why both fish species are oviparous.

their embryos develop inside eggs ✓ that are outside the body of the female ✓ (2)



2.5.3 Describe TWO ways in which the chances of fertilisation are increased in the northern pike fish.

- the males release semen all around the female ✓
- a large number of gametes/ova are produced ✓ (2)

2.5.4 Which graph (X or Y) represents the survival rate of the northern pike fish?

X ✓ (1)

2.5.5 Explain your answer to QUESTION 2.5.4.

- they will have a higher number of surviving embryos ✓ /eggs/offspring (1)
- because their fertilised eggs are attached to the vegetation ✓
- where they are protected from predators ✓ /washing away (3)

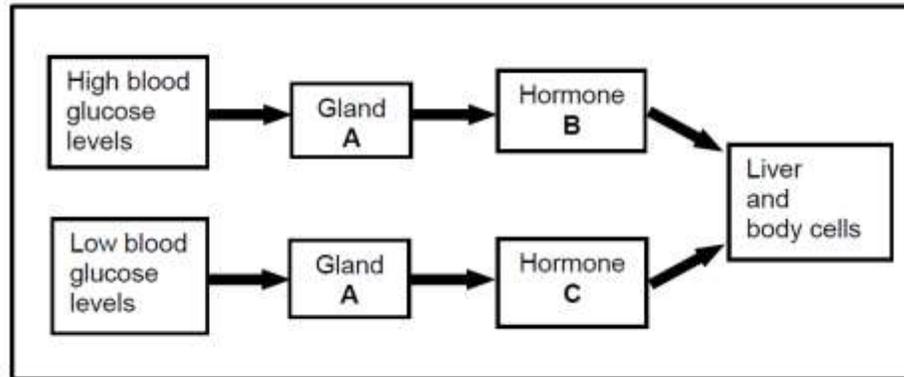
Common misconceptions & Errors

2.5.2 Candidates confused the location of 'fertilisation' with the location of 'embryonic development'.

SECTION B – Homeostasis & Endocrine system

2.6

The diagram below shows the homeostatic control of blood glucose levels.



2.6.1 Identify:

(a) Gland **A**

(b) Hormone **C**

2.6.2 A certain disorder causes decreased production of hormone **B**.

(a) Explain how this will affect the blood glucose levels.

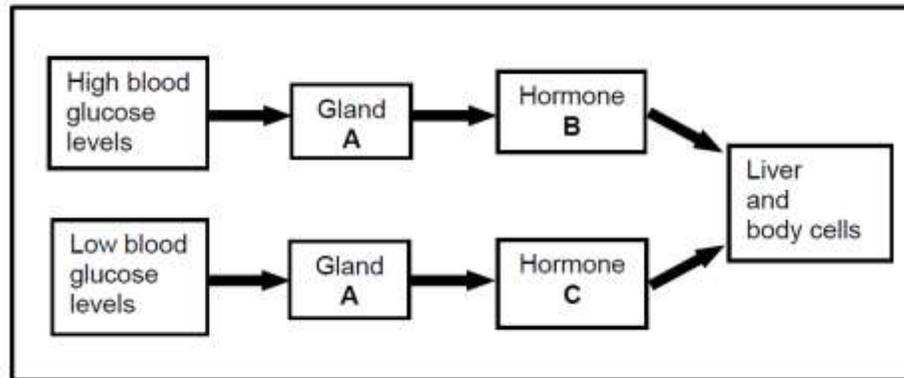
(b) Name the disorder.

Common misconceptions & Errors

SECTION B – Homeostasis & Endocrine system

2.6

The diagram below shows the homeostatic control of blood glucose levels.



2.6.1 Identify:

(a) Gland **A**

Pancreas✓/

Islets of Langerhans (1)

(b) Hormone **C** Glucagon✓ (1)

2.6.2 A certain disorder causes decreased production of hormone **B**.

(a) Explain how this will affect the blood glucose levels.

- the blood glucose levels will remain high✓
- because the cells will not be able to absorb glucose✓ from the blood
- excess glucose cannot be converted to glycogen by the liver✓/muscles (3)

(b) Name the disorder. Diabetes✓ mellitus (1)

Common misconceptions & Errors

2.6.2 (a) Candidates lost marks for stating that insulin converted glucose to glycogen, instead of stating that insulin 'causes the liver to convert glucose to glycogen'.

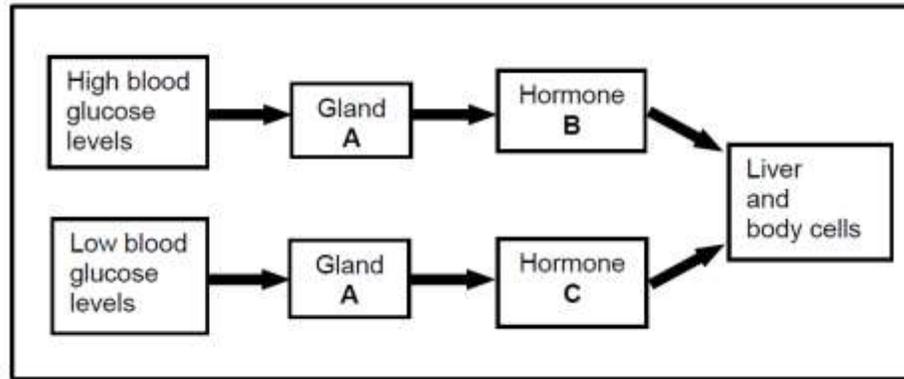
'Glucagon' and 'glycogen' were confused and used interchangeably.

SECTION B – Homeostasis & Endocrine system

2.6

The diagram below shows the homeostatic control of blood glucose levels.

2.6.3 Scientists have been investigating the use of adrenalin as a treatment for people who cannot produce hormone C.



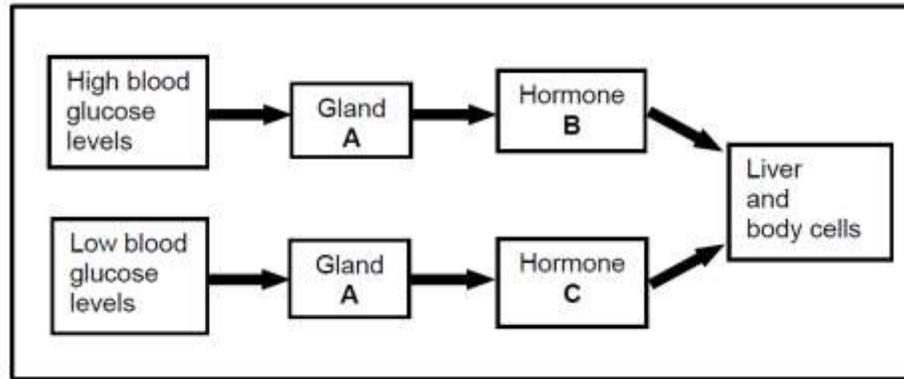
Explain why this treatment may work.

Common misconceptions & Errors

SECTION B – Homeostasis & Endocrine system

2.6

The diagram below shows the homeostatic control of blood glucose levels.



2.6.3 Scientists have been investigating the use of adrenalin as a treatment for people who cannot produce hormone C.

Explain why this treatment may work.

- adrenalin stimulates the liver ✓
- to convert glucose to glycogen ✓
- to increase the blood glucose levels ✓ (3)

Common misconceptions & Errors

2.6.3 Candidates ignored the comparison between hormone C and adrenalin and simply stated the functions of adrenalin.

SECTION B QUESTION 2 – Suggestions for improvement

- ✓ Teach **structure & function** with the **use of diagrams**, e.g. structure of the reproductive system or a sperm cell.
- ✓ Provide **different views** (i.e. side view & front view) of structures.
- ✓ Give learners opportunity to **draw and label diagrams** themselves.
- ✓ Perform activities where learners **write down a description of a term** to link the two together.
- ✓ Emphasise **structural suitability** – first describe the feature (e.g. 'long, whip-like tail') then explain how it is suited to its function (e.g. 'to facilitate rapid movement').
- ✓ Expose learners to **more data-response questions** in class.
- ✓ Location of fertilisation vs location of embryonic development.  Let's revise this
- ✓ Teach the **advantages and disadvantages of** all the **reproductive strategies**.
- ✓ **Emphasise deviation from** the **normal state** – a diabetic's *glucose levels* **remain** high, not are high (this could be true of a non-diabetic after a meal as well).

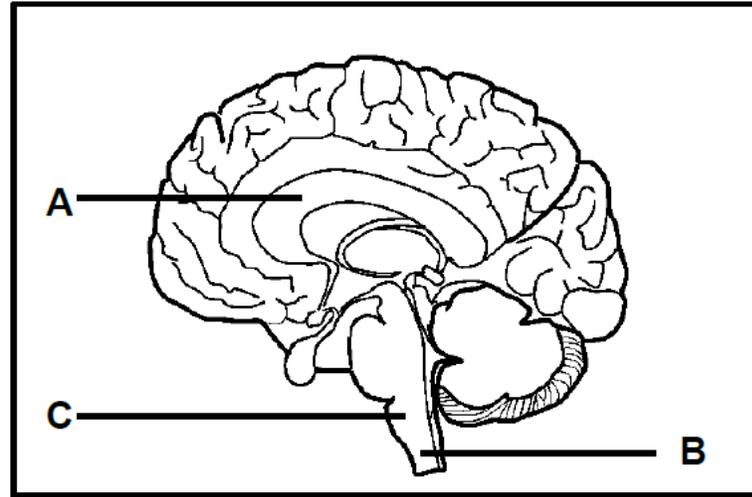
SECTION B – Nervous system

3.1

The diagram below shows a part of the human brain.

3.1.1 Identify part **A**.

3.1.2 Explain why a person may die if part **C** is damaged.



Common misconceptions & Errors

3.1.3 Part **B** is damaged in a person's lower back.

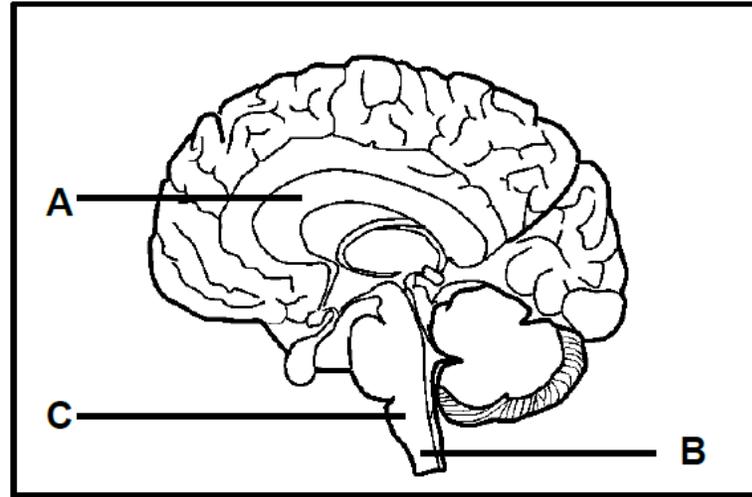
(a) Identify part **B**.

(b) Explain why the person will have no control of the skeletal muscles in the legs.

SECTION B – Nervous system

3.1

The diagram below shows a part of the human brain.



3.1.1 Identify part **A**.

Corpus callosum ✓ (1)

3.1.2 Explain why a person may die if part **C** is damaged.

- it controls vital processes/heart beat/breathing/maintaining blood pressure ✓
- which will no longer occur ✓ when it is damaged (2)

3.1.3 Part **B** is damaged in a person's lower back.

(a) Identify part **B**.

Spinal cord ✓ (1)

(b) Explain why the person will have no control of the skeletal muscles in the legs.

- impulses from the cerebrum/cerebral cortex ✓
- can no longer be transmitted ✓ (2)

Common misconceptions & Errors

3.1.1 Candidates confused the 'corpus luteum' and the 'corpus callosum'.

3.1.2 & 3.1.3 (b) Candidates could not explain. To assess understanding of a structure's function, a question is posed to indicate what would happen in the absence of the structure. Therefore, start the response with a description of the function of the structure and then move to explain what would happen if those functions ceased.

3.1.3 (b) Candidates did not know which part of the brain controlled skeletal muscles.

SECTION B – Data response/Graphing skills

- 3.2** The table below shows the recorded number of severe brain injuries per 100 000 people per year in different regions of the world.

REGIONS OF THE WORLD	NUMBER OF SEVERE BRAIN INJURIES (PER 100 000 PEOPLE PER YEAR)
Latin America	900
USA and Canada	1 300
East Mediterranean	890
Europe	1 010
Africa	800

3.2.1 Which region has the smallest number of severe brain injuries?

3.2.2 Explain why this data may not be accurate for the region named in QUESTION 3.2.1?

Common misconceptions & Errors

SECTION B – Data response/Graphing skills

3.2 The table below shows the recorded number of severe brain injuries per 100 000 people per year in different regions of the world.

REGIONS OF THE WORLD	NUMBER OF SEVERE BRAIN INJURIES (PER 100 000 PEOPLE PER YEAR)
Latin America	900
USA and Canada	1 300
East Mediterranean	890
Europe	1 010
Africa	800

3.2.1 Which region has the smallest number of severe brain injuries?

Africa ✓ (1)

3.2.2 Explain why this data may not be accurate for the region named in QUESTION 3.2.1?

- all brain injuries may not have been recorded ✓
- due to lack of/poor hospitals/medical facilities ✓ (2)

Common misconceptions & Errors

SECTION B – Data response/Graphing skills

3.2 The table below shows the recorded number of severe brain injuries per 100 000 people per year in different regions of the world.

3.2.3 Draw a bar graph to represent the data in the table. (6)

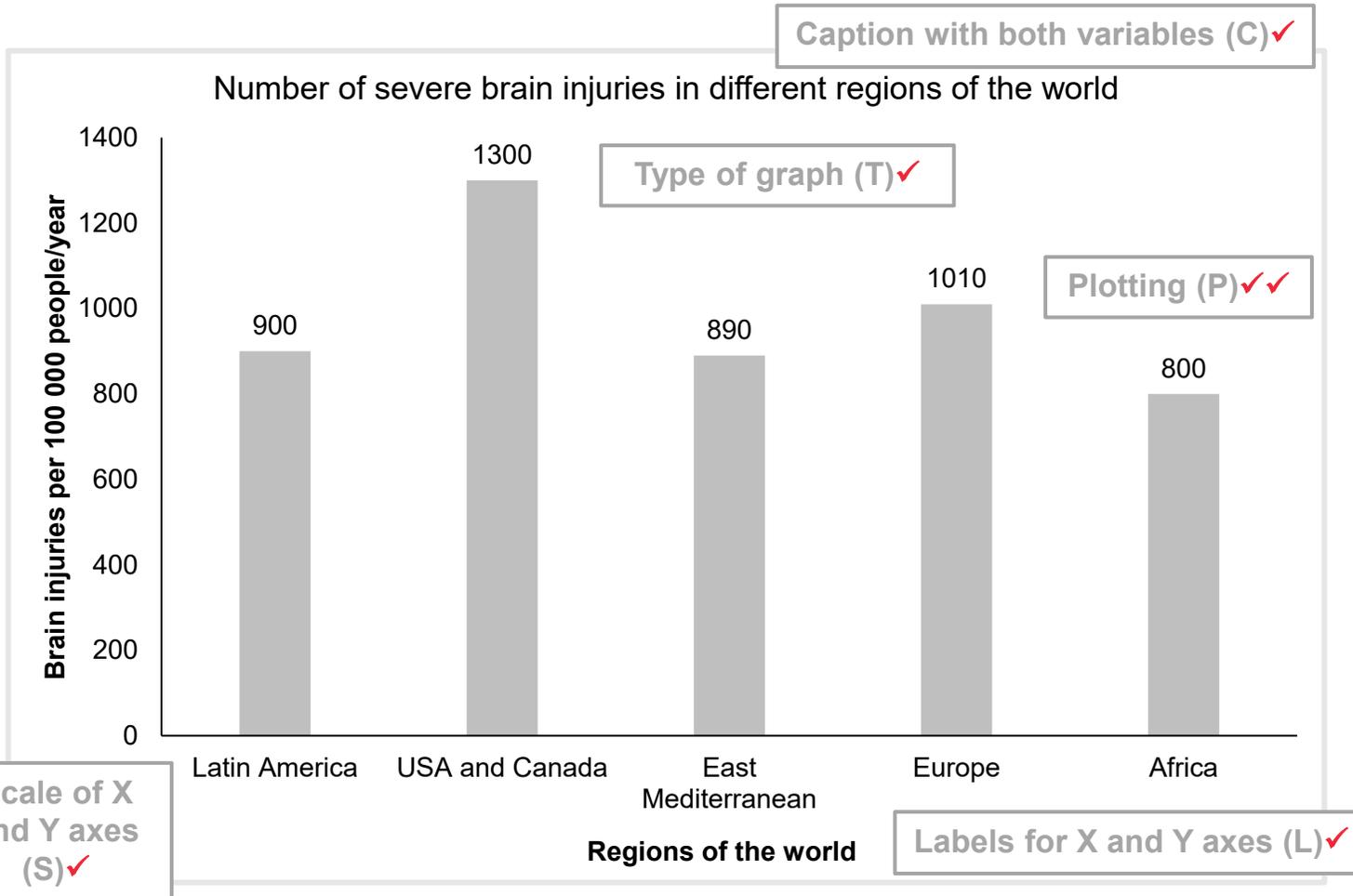
REGIONS OF THE WORLD	NUMBER OF SEVERE BRAIN INJURIES (PER 100 000 PEOPLE PER YEAR)
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Common misconceptions & Errors

SECTION B – Data response/Graphing skills

3.2 The table below shows the recorded number of severe brain injuries per 100 000 people per year in different regions of the world.

3.2.3 Draw a bar graph to represent the data in the table. (6)



Common misconceptions & Errors

3.2.3 Candidates lost marks due to:

- drawing a histogram instead of bar graph
- graph caption only containing one variable
- X-axis not being labelled
- Y-axis label not having a unit
- Incorrect plotting
- Inconsistent drawing of the bars (different widths)

SECTION B – Sense organs

3.3

The diagram below represents a part of the human ear.

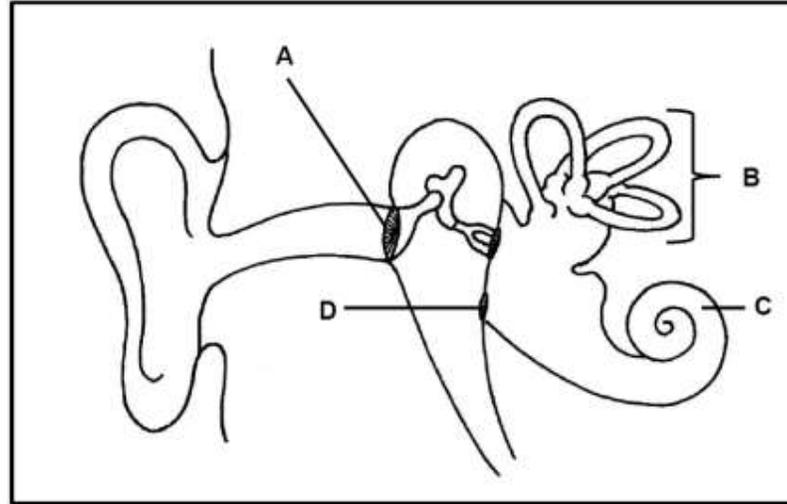
3.3.1 Identify part **C**.

3.3.2 State ONE function of:

(a) Part **D**

(b) The receptors found in part **C**.

3.3.3 Explain why build-up of ear wax at part **A** may result in temporary hearing loss.

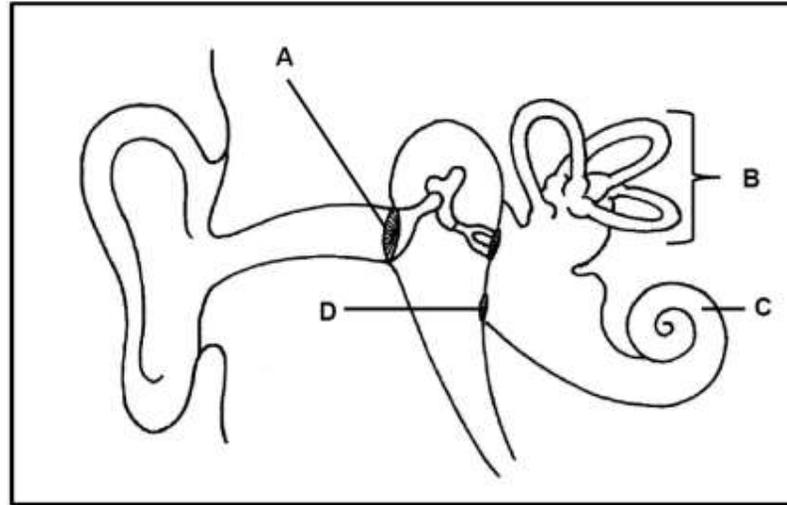


Common misconceptions & Errors

SECTION B – Sense organs

3.3

The diagram below represents a part of the human ear.



3.3.1 Identify part C.

Cochlea ✓ (1)

3.3.2 State ONE function of:

(a) Part D

Absorbs the excess pressure waves/releases pressure from inner ear/prevents echoes ✓ (first 1 only)

(b) The receptors found in part C.

Convert stimuli (pressure waves) into impulses ✓ (first 1 only)

3.3.3 Explain why build-up of ear wax at part A may result in temporary hearing loss.

- Part A (tympanic membrane) will not be able to vibrate freely ✓
- So that no/less vibrations are transferred to the middle ear/ossicles ✓ (2)

Common misconceptions & Errors

3.3.3 Candidates did not recognise the build up of wax on the tympanic membrane. They referred to the inability of sound waves to pass through the tympanic membrane and not its inability to vibrate freely.

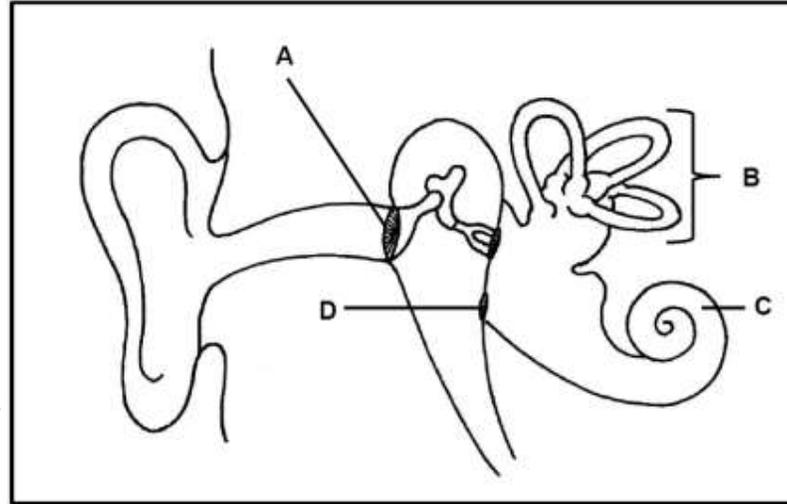
SECTION B – Sense organs

3.3

The diagram below represents a part of the human ear.

3.3.4 A grommet is a small device that allows the air to move into and out of the middle ear. This prevents pressure build-up in the middle ear.

Explain how the use of grommets in the treatment of middle-ear infections prevents hearing loss.



Common misconceptions & Errors

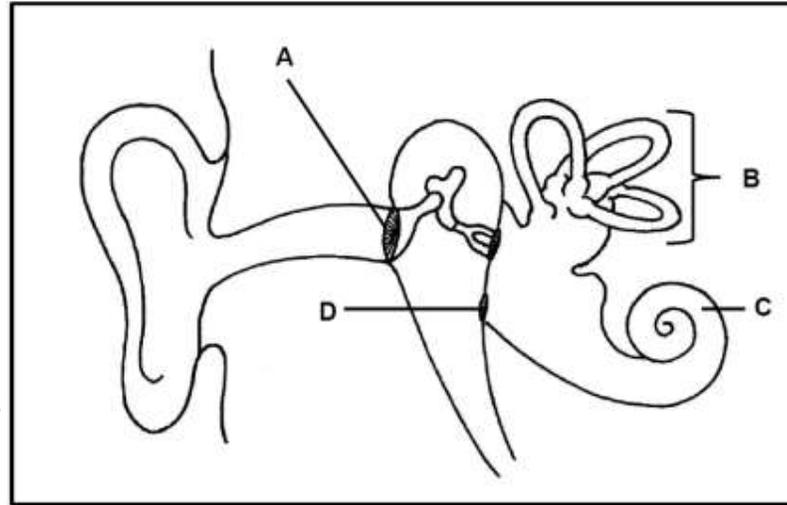
SECTION B – Sense organs

3.3

The diagram below represents a part of the human ear.

3.3.4 A grommet is a small device that allows the air to move into and out of the middle ear. This prevents pressure build-up in the middle ear.

Explain how the use of grommets in the treatment of middle-ear infections prevents hearing loss.



- fluids build up in the middle ear ✓
- this blocks the Eustachian tube ✓
- tympanic membrane/ossicles cannot vibrate freely ✓
- grommets can drain excess fluids ✓
- to release pressure that builds up in the middle ear ✓
- this equalises pressure on either side of the tympanic membrane ✓
- and prevents the tympanic membrane from bursting ✓
- and allows the ossicles to vibrate freely ✓ (any 4)

Common misconceptions & Errors

3.3.4 Candidates did **not understand the disorder** (middle-ear infection) **and its treatment.**

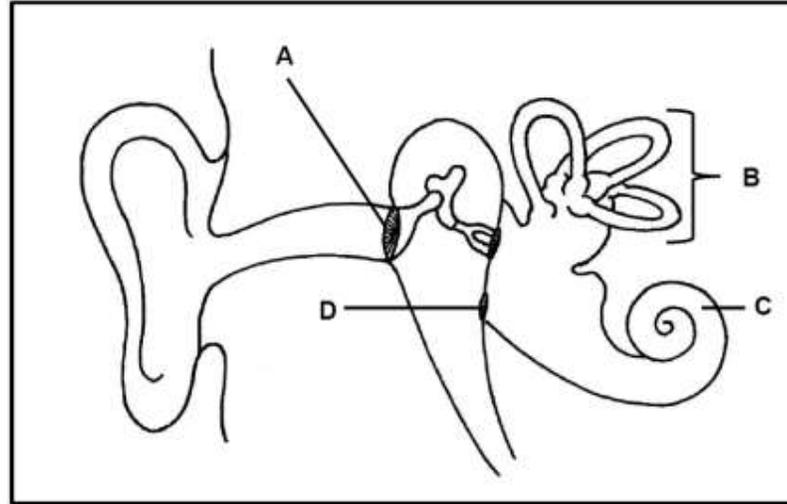
Candidates **could not distinguish between the stimuli in different parts of the ear.** They used 'sound waves', 'vibrations' and 'pressure waves' interchangeably.

SECTION B – Sense organs

3.3

The diagram below represents a part of the human ear.

3.3.5 Describe how the receptors in part **B** are involved in maintaining balance when there are changes in the speed and direction of movement of the head.



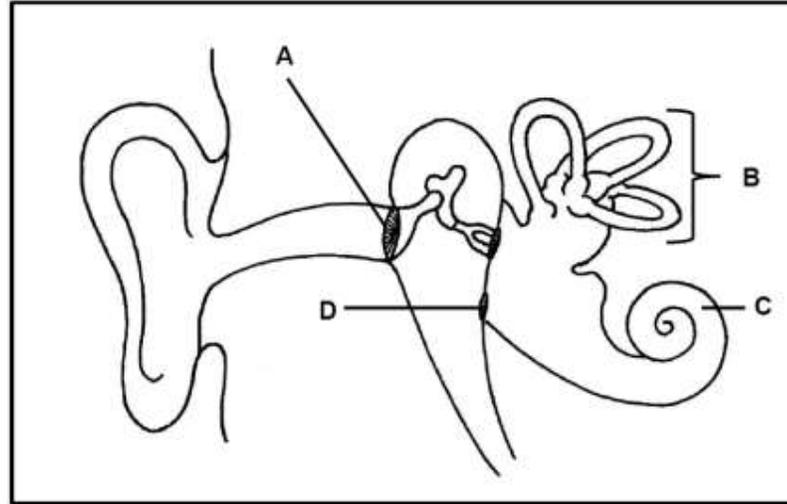
Common misconceptions & Errors

SECTION B – Sense organs

3.3

The diagram below represents a part of the human ear.

3.3.5 Describe how the receptors in part **B** are involved in maintaining balance when there are changes in the speed and direction of movement of the head.



- the cristae are stimulated ✓ and
- convert the stimuli into impulses ✓
- the impulses are sent via the auditory nerve/vestibular branch ✓
- to the cerebellum ✓
- which interprets the information ✓ and
- sends impulses to the skeletal muscles ✓ to restore balance (any 4)

Common misconceptions & Errors

3.3.5 Candidates could name the receptors involved but could not explain their role in maintenance of balance.

Candidates failed to mention that the receptors 'convert a stimulus into an impulse'.

SECTION B – Scientific Investigation Homeostasis

3.4 Wearing a face mask is recommended to reduce the spread of the coronavirus. There are some concerns about the efficiency of breathing when wearing a face mask.

Scientists investigated the effect of wearing face masks on the carbon dioxide levels in blood.

They:

- Obtained permission from 150 healthy volunteers, aged 30, to participate in the investigation
- Applied a sensor to the participants' skin to measure the carbon dioxide levels in the blood
- Asked the participants to:
 - Sit still for 10 minutes without wearing a face mask
 - Sit still for 10 minutes while wearing a face mask
 - Exercise for 10 minutes without wearing a face mask
 - Exercise for 10 minutes while wearing a face mask
- Allowed a 15-minute interval between each 10-minute phase
- Recorded the carbon dioxide levels at the end of each 10-minute phase
- Ensured that the face mask covered the nose and mouth

3.4.1 Identify the:

- (a) Independent variable
- (b) Dependent variable

Common misconceptions & Errors

SECTION B – Scientific Investigation Homeostasis

3.4 Wearing a face mask is recommended to reduce the spread of the coronavirus. There are some concerns about the efficiency of breathing when wearing a face mask.

Scientists investigated the effect of wearing face masks on the carbon dioxide levels in blood.

They:

- Obtained permission from 150 healthy volunteers, aged 30, to participate in the investigation
- Applied a sensor to the participants' skin to measure the carbon dioxide levels in the blood
- Asked the participants to:
 - Sit still for 10 minutes without wearing a face mask
 - Sit still for 10 minutes while wearing a face mask
 - Exercise for 10 minutes without wearing a face mask
 - Exercise for 10 minutes while wearing a face mask
- Allowed a 15-minute interval between each 10-minute phase
- Recorded the carbon dioxide levels at the end of each 10-minute phase
- Ensured that the face mask covered the nose and mouth

3.4.1 Identify the:

- (a) Independent variable **Wearing of a face mask** ✓ (1)
- (b) Dependent variable **Carbon dioxide levels in blood** ✓ (1)

Common misconceptions & Errors

3.4.1 (a) Candidates gave an **incomplete description of the variable**, i.e. just 'face masks' and not 'wearing of a face mask'

3.4.1 (b) Candidates gave an **incomplete description of the variable**, i.e. just 'CO₂ levels' and not 'CO₂ levels in the blood'

SECTION B – Scientific Investigation Homeostasis

3.4 3.4.2 State TWO factors that were taken into consideration in the selection of the participants.

3.4.3 Give ONE reason why the results at the end of this investigation may be considered reliable.

3.4.4 Explain why the scientists allowed a 15-minute interval between each phase.

3.4.5 Give a reason why the carbon dioxide levels were measured while participants were sitting still.

Common misconceptions & Errors

SECTION B – Scientific Investigation Homeostasis

3.4 3.4.2 State TWO factors that were taken into consideration in the selection of the participants.

- Age✓ / 30
- Healthy✓ individuals (first 2 only)

3.4.3 Give ONE reason why the results at the end of this investigation may be considered reliable.

150 volunteers were used✓ (first 1 only)

3.4.4 Explain why the scientists allowed a 15-minute interval between each phase.

- To allow the carbon dioxide levels in the blood to go back to normal✓
- So that each phase will have the same carbon dioxide level as a starting point✓ (2)

3.4.5 Give a reason why the carbon dioxide levels were measured while participants were sitting still.

- To act as a control✓ / baseline
- To see if it is the face mask that affects the carbon dioxide levels and not the physical activity✓ (any 1)

Common misconceptions & Errors

3.4.3 Candidates gave generic answers, e.g. 'increase sample size' or 'repeat investigation', instead of applying their responses to the specific investigation.

3.4.4 & 3.4.5 Candidates gave generic answers, e.g. 'to ensure validity', instead of applying their responses to the specific investigation.

SECTION B – Scientific Investigation Homeostasis

3.4 3.4.6 Describe the *homeostatic control* of carbon dioxide when it is high in blood.

Common misconceptions & Errors

SECTION B – Scientific Investigation Homeostasis

3.4 3.4.6 Describe the *homeostatic control* of carbon dioxide when it is high in blood.

- Receptors in the carotid artery are stimulated✓ and
- impulses are sent to the medulla oblongata✓
- The medulla oblongata stimulates the heart✓
- to beat faster✓ causing
- more carbon dioxide to be taken into the lungs✓
- The breathing muscles✓/ intercostal muscles and diaphragm
- contract more actively✓ and
- the rate and depth of breathing increases✓
- More carbon dioxide is exhaled✓
- The carbon dioxide level in the blood decreases✓/ returns to normal

(any 7)

Common misconceptions & Errors

3.4.6 Candidates struggled to get full marks due to **incomplete answers** and **not** being **specific about** what happens to the **CO₂ levels** and where it happens (i.e. the blood or the lungs).

SECTION B – Scientific Investigation Homeostasis

3.5

Read the extract below.

Auxins control different aspects of growth and development in plants. They are known to influence the growth of stems and they also stimulate the development of new roots on stem cuttings in plant propagation.

During plant propagation, a stem of a plant is cut and is then placed in water containing small quantities of artificial auxins. The auxins stimulate root development in the cuttings.

3.5.1 Name TWO places in plants where auxins are produced.

3.5.2 State TWO ways in which auxins cause an increase in the length of stems.

3.5.3 Name ONE other plant hormone that causes an increase in the length of stems.

3.5.4 Explain how auxins can be used in plant propagation to the advantage of nature conservation.

Common misconceptions & Errors

SECTION B – Scientific Investigation Homeostasis

3.5

Read the extract below.

Auxins control different aspects of growth and development in plants. They are known to influence the growth of stems and they also stimulate the development of new roots on stem cuttings in plant propagation.

During plant propagation, a stem of a plant is cut and is then placed in water containing small quantities of artificial auxins. The auxins stimulate root development in the cuttings.

3.5.1 Name TWO places in plants where auxins are produced.

- Apical tip of the stem ✓ /apical bud
- Apical tip of the root ✓ (first 2 only)

3.5.2 State TWO ways in which auxins cause an increase in the length of stems.

- Stimulate cell division ✓ /mitosis
- Stimulate cell elongation ✓ (first 2 only)

3.5.3 Name ONE other plant hormone that causes an increase in the length of stems.

- Gibberellins ✓ (first 1 only)

3.5.4 Explain how auxins can be used in plant propagation to the advantage of nature conservation.

- Increased plant growth ✓
- saves species that are facing extinction ✓ (2)

Common misconceptions & Errors

3.5.1 Candidates did not know the **location of auxins in roots**.

3.5.2 Candidates **could not express HOW** auxins increase the length of stems.

3.5.4 Candidates **struggled to extrapolate** from the information in the extract.

SECTION B QUESTION 3 – Suggestions for improvement

- ✓ Teach **structure & function** with the **use of diagrams**, e.g. structure of the brain.
- ✓ Practice responding to 'explain' questions relating to disorders or disease states:
 - *First identify the structure and name it*
 - *State its function under normal circumstances*
 - *Describe the consequences in the absence of its function*
 - *Describe how the body may respond to compensate for the change (where applicable)*
- ✓ **Practice drawing** ALL types of **graphs**. Show learners the marking rubric for graphs used in the NSC exams.
- ✓ Emphasise the **different types of stimuli** for **each part of the ear**.
- ✓ Write **FULL answers**, not just phrases or terms.



SECTION B QUESTION 3 – Suggestions for improvement

- ☑ Emphasise **negative feedback mechanisms**. Break them up into steps :
 - State the **stimulus or variable**
 - State the **receptor**
 - State the **control centre**
 - State the **effector(s)**
 - State the **effect**
 - State the **outcome**
- ☑ Make sure learners **know ALL the functions of auxins** in plants. Expose learners to the practical design of the **various hormone experiments** with auxins.
- ☑ Do not give generic answers in scientific investigations. **Respond to the specific context** of the investigation presented.
- ☑ **Use the AIM** of the investigation **to identify variables**, not the RESULTS. Express variables in full.



END

SOME DISORDERS OF HUMAN PHYSIOLOGY – Goitre



Simple goitre

- ✓ Caused by a **lack of iodine (I)** in the diet.
- ✓ Iodine is **required** for the thyroid gland to **produce thyroxin**.
- ✓ Thyroxin exercises negative feedback on the pituitary.
 - When thyroxin levels are high, the pituitary is inhibited and secretes less TSH.
 - When thyroxin levels are low, the pituitary is stimulated and secretes more TSH.
- ✓ Without sufficient iodine the thyroid gland cannot produce thyroxin.
 - The negative feedback loop to the pituitary is not alleviated.
 - Continuous stimulation of the thyroid gland by TSH causes the gland to enlarge.
 - This is known as goitre.



goitre: a disorder characterised by an enlargement of the thyroid gland

NOTE

Hyper- and hypothyroidism are terms used to **describe the amount of thyroxin being secreted** by the thyroid gland. They lead to disorders like goitre, myxoedema and cretinism.

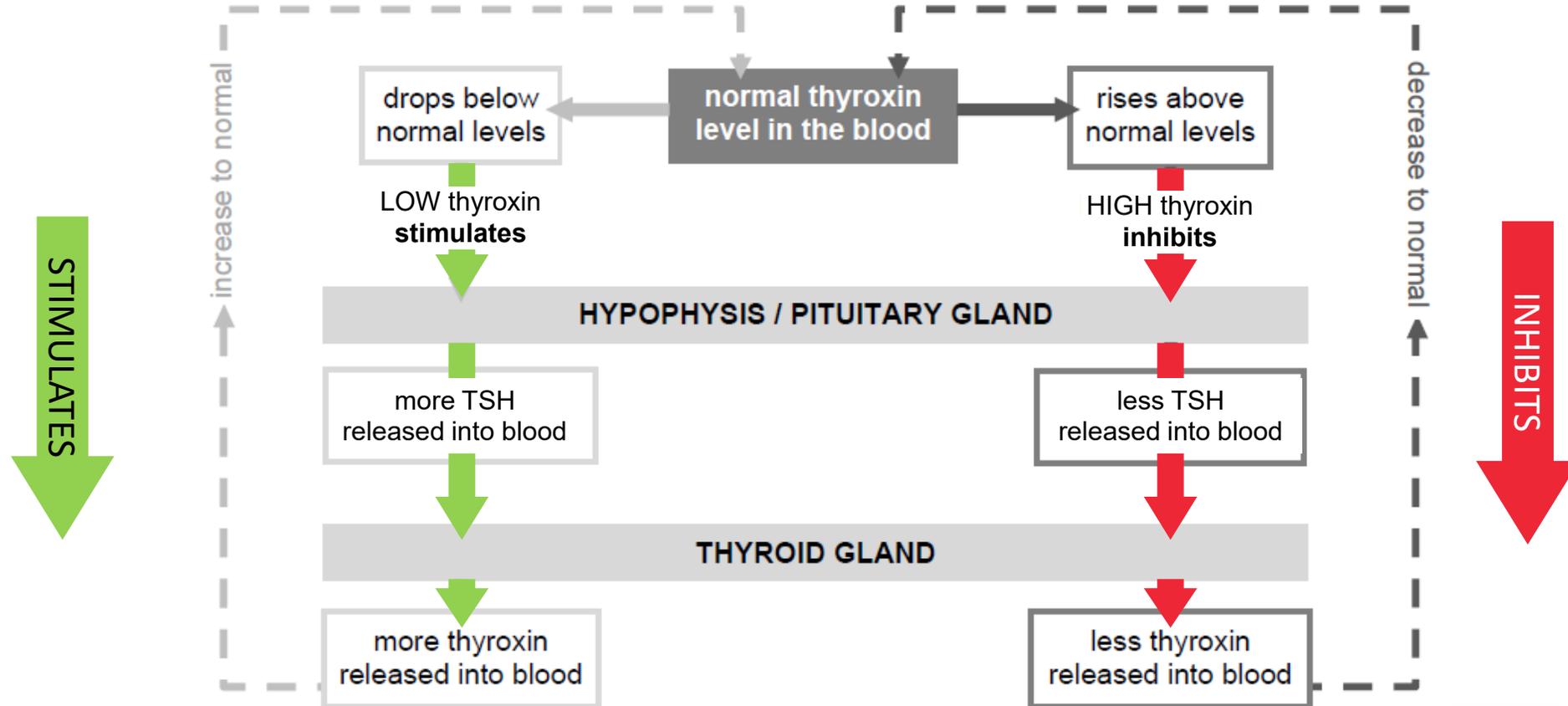


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Continue learning about thyroxin & TSH

SOME DISORDERS OF HUMAN PHYSIOLOGY – Goitre



Negative feedback mechanism between the hypophysis and the thyroid



Extract from *The Answer Series*
Grade 12 Life Sciences Part 1 p. 73



SOME DISORDERS OF HUMAN PHYSIOLOGY – Diabetes Mellitus

- ✓ Caused by a **deficiency in insulin** that leads to **constantly high blood glucose levels**.
- ✓ Under normal conditions blood glucose levels are kept constant by the action of antagonistic hormones insulin and glucagon.
- ✓ A deficiency in insulin may result from:
 - damage to the beta cells in the pancreas so that they cannot produce any insulin – Type 1 Diabetes
 - body cells that become resistant to insulin due to lifestyle related factors – Type 2 Diabetes
- ✓ High blood glucose levels cause cells to lose water by osmosis, resulting in dehydration.
- ✓ The person may fall into a coma and organs may be damaged beyond repair.
- ✓ Long-term complications of diabetes include blindness, kidney failure and cardiovascular diseases.
- ✓ Symptoms of diabetes:
 - frequent urination
 - increased thirst
 - increased hunger
 - inexplicable weight loss
 - repeated infections
 - exhaustion and dizziness
 - wounds heal slowly
 - impaired vision

NOTE

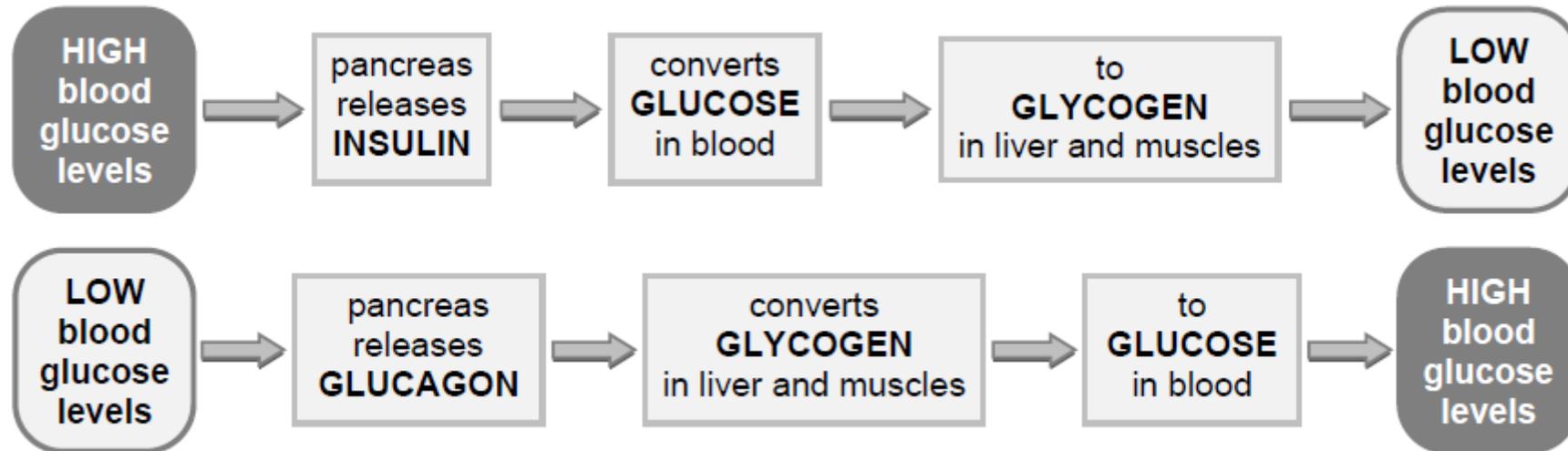
*The blood glucose levels in a Diabetic **remain high** without treatment.*

Extract from *The Answer Series*
Grade 12 Life Sciences Part 1 p. 75

 Continue learning about diabetes

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SOME DISORDERS OF HUMAN PHYSIOLOGY – Diabetes Mellitus



Action of hormones insulin and glucagon

Extract from *The Answer Series*
Grade 12 Life Sciences Part 1 p. 74

 [Continue to spinal cord injuries](#)

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SOME DISORDERS OF HUMAN PHYSIOLOGY – Spinal cord injuries

- ✓ The spinal cord forms part of the central nervous system (CNS) that **extends from the medulla oblongata**. It starts **just below the foramen magnum** and extends through the vertebral canal of the vertebral column to the lumbar region.

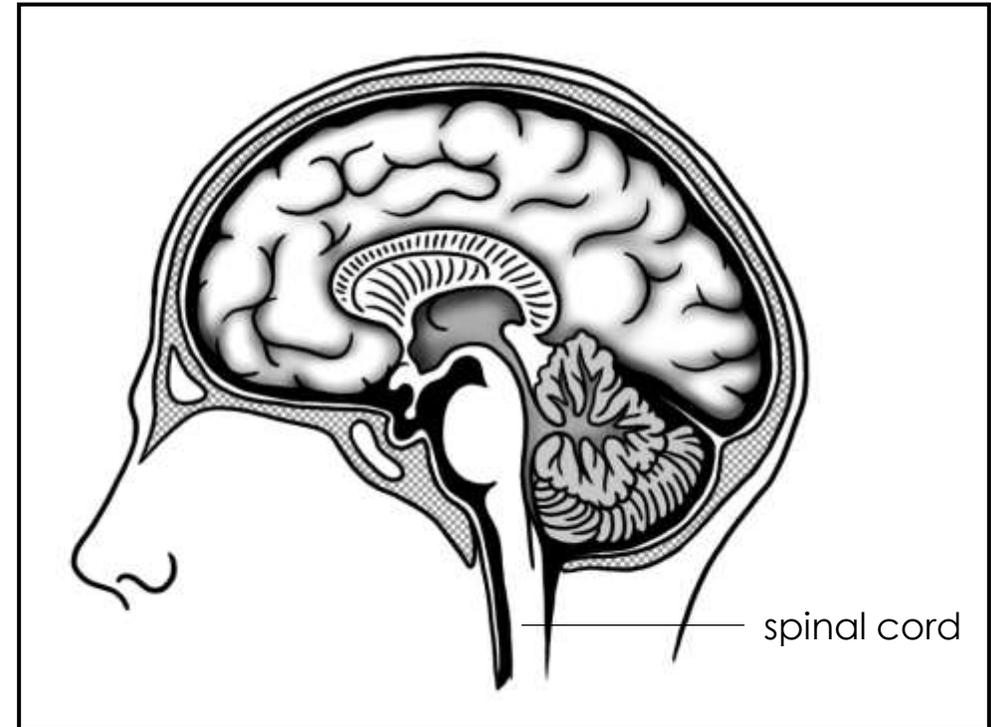
Functions

- 1 It **provides a pathway for nerve impulses** to and from the brain. Nerve impulses from receptors enter the spinal cord via spinal nerves. Impulses are then transmitted along ascending tracts in the spinal cord to the brain. The impulses are transmitted from the brain, via motor neurons in descending tracts, back down the spinal cord.

NOTE

If the spinal cord is damaged, the pathway for nerve impulses is cut off. Impulses will not be conducted from the cerebrum/cerebellum to effectors, e.g. skeletal muscles.

- 2 The spinal cord **contains reflex centres** that initiate reflex actions. These reflex actions are rapid, involuntary responses that occur independently of the brain to protect the body from injury.



Extract from *The Answer Series*
Grade 12 Life Sciences Part 1 p. 39 - 42

[Continue learning about middle-ear infections](#)

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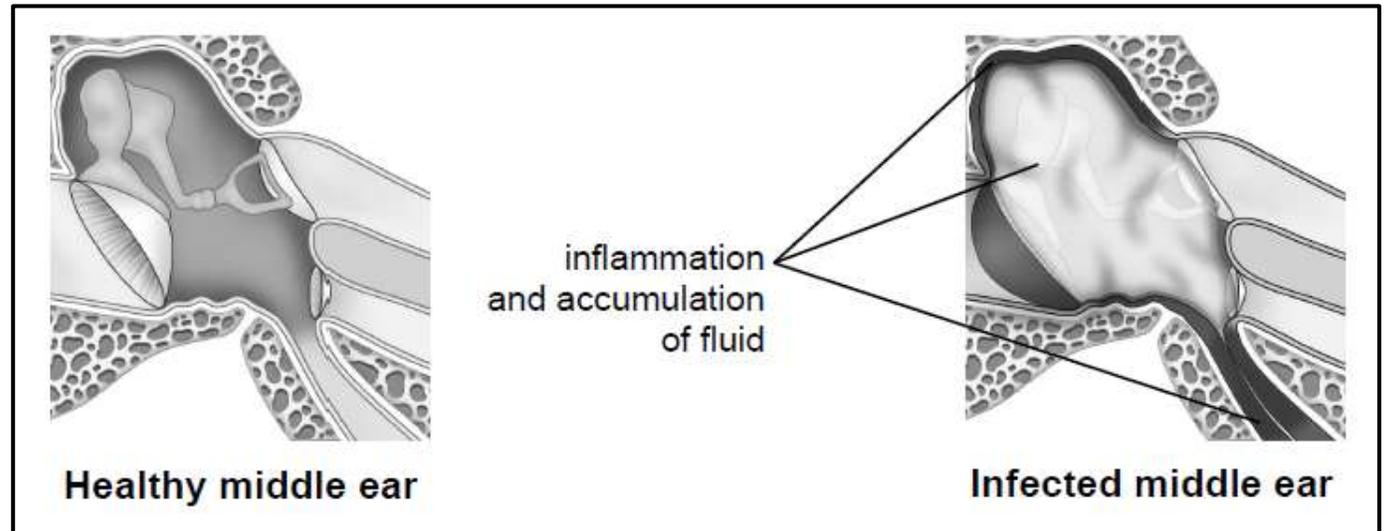
SOME DISORDERS OF HUMAN PHYSIOLOGY – Middle ear infections

- ✓ Middle ear infection, also known as **otitis media**, is an inflammation due to infection of the middle ear and is the most common cause of earache in children.
- ✓ Commonly caused by **viral infections** of the upper respiratory tract causing the tissue of the nose and throat to become inflamed and swollen.
- ✓ Structures in the middle ear, e.g. the **Eustachian tube**, cannot function properly.

NOTE

Structures of the middle ear include the tympanic membrane, ossicles, oval window, round window and opening of the Eustachian tube.

- ✓ Fluid builds up in the middle ear which:
 - **blocks the Eustachian** tube
 - causes the **tympanic membrane** to bulge and **not vibrate freely** (could potentially burst)
 - causes the **ossicles** to **not vibrate freely**

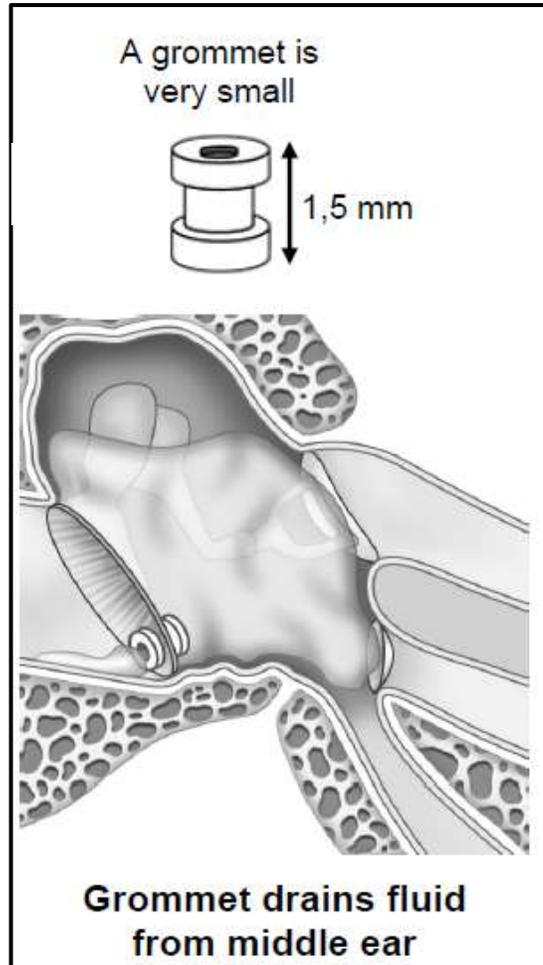


Extract from *The Answer Series*
Grade 12 Life Sciences Part 1 p. 69

[Continue learning about middle-ear infections](#)

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SOME DISORDERS OF HUMAN PHYSIOLOGY – Middle ear infections



Treatment

- ✓ One way of treating middle ear infection is by making a small cut in the tympanic membrane to drain the fluid from the middle ear cavity. A **grommet** (ventilation tube) is inserted into the eardrum.
- ✓ The grommet takes over the function of the ineffective Eustachian tube and allows the middle ear to drain, recover and **equalises the pressure** on **either side of the tympanic membrane**.
- ✓ It allows air to enter the middle ear, **drain the excess fluid** and **releases the pressure** that has built up in the middle ear.
- ✓ The tympanic membrane and ossicles can **vibrate freely** once more.

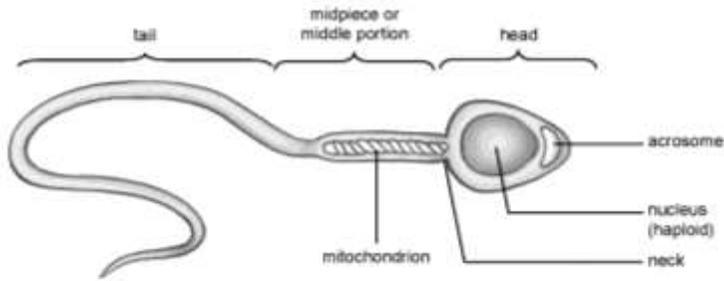
COMMONLY CONFUSED TERMS – Sperm and semen

Structure and adaptations of a sperm cell

A sperm cell is microscopic in size and consists of three parts, i.e. **head**, **midpiece or middle portion** and **tail**.

NOTE

If sperm are not released, they eventually die and degenerate in the epididymis.



- ▶ The **head** contains the **haploid cell nucleus** with the male genetic material (23 chromosomes).
- ▶ The **acrosome** is a sac at the front containing lytic enzymes that digest/dissolve the protective jelly layer (*zona pellucida*) of the ovum to allow the sperm's head and nucleus to penetrate the ovum's membranes.
- ▶ The **midpiece/middle portion** contains many mitochondria that provide energy to the tail for locomotion.
- ▶ The **tail** performs whip-like movements that propel the sperm through the seminal fluid allowing it to swim towards the ovum.
- ▶ The **cytoplasm** of the sperm cell is **reduced/condensed** making it lighter for efficient movement.
- ▶ The sperm cell has a **streamlined shape** to enable faster and easier movement.
- ▶ The life span of a sperm cell is 3 – 5 days inside the female reproductive tract.

NOTE

The term 'sperm' may refer to a single sperm cell (singular) as well as many sperm cells (plural).

Extract from *The Answer Series*
Grade 12 Life Sciences Part 1 p. 12 & 17

Sperm

- ✓ The **haploid male gamete(s)**.
- ✓ Produced by the testes during **spermatogenesis**.
- ✓ Must be **transported in a fluid medium** that is provided by the accessory glands.

Semen

- ✓ All the **accessory glands** (seminal vesicle, prostate gland and Cowper's gland) **secrete fluids** to transport sperm.
- ✓ The **fluid and sperm** are **collectively called semen**.



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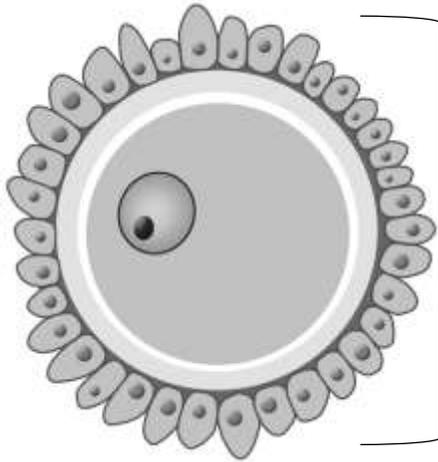
Continue learning – egg vs ovum



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COMMONLY CONFUSED TERMS – Ovum and egg

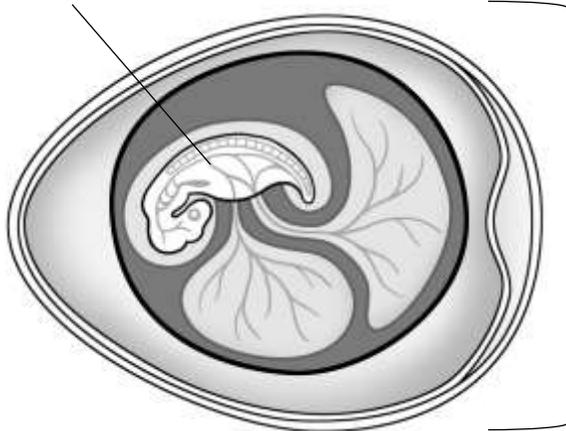
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Grade 12 Life Sciences Part 1 p. 5 & 18



Ovum

- ✓ Unfertilised, haploid female **gamete**.
- ✓ Sometimes referred to as the *egg cell*.

developing
embryo



Egg

- ✓ Produced by oviparous and ovoviviparous animals.
- ✓ The structure that **surrounds the developing embryo** in certain animals.
- ✓ The structure **where embryonic development occurs**.



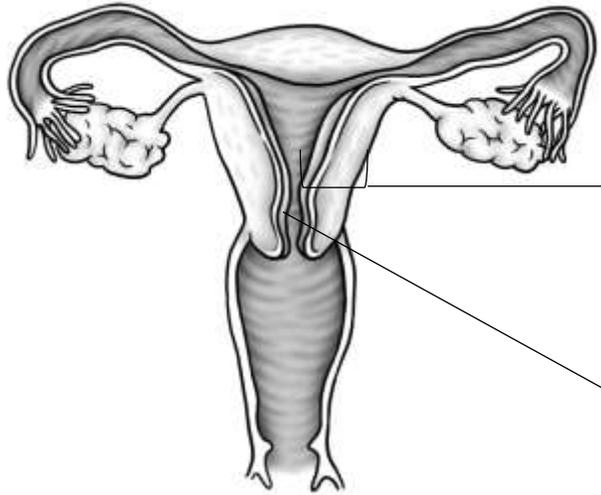
Continue learning – urine wall vs uterine lining



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COMMONLY CONFUSED TERMS – Uterine wall and uterine lining

Extract from *The Answer Series*
Grade 12 Life Sciences Part 1 p. 13 & 17

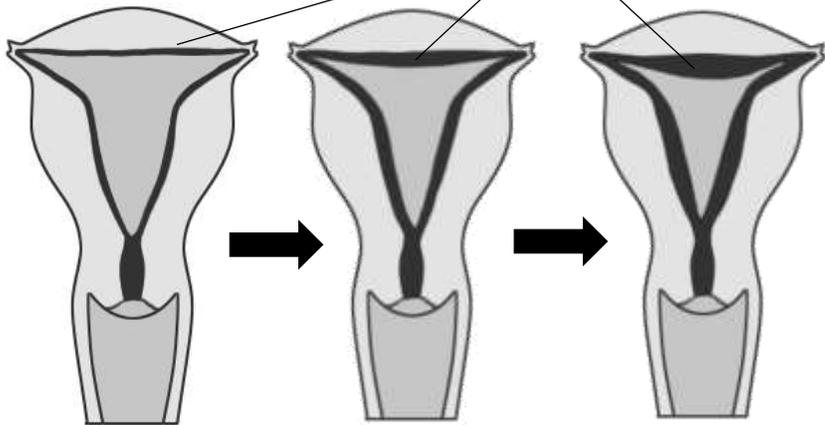


Uterine wall

- ✓ The wall of the uterus consists of three layers, i.e. an **outer serous layer** (membranous), a **muscular layer** of smooth, involuntary muscle and the **endometrium** (mucous membrane) that lines the uterus on the inside.

Uterine lining

- ✓ Also referred to as the **endometrium**, i.e. the inner lining of the uterine wall.
- ✓ Every month, the endometrium (lining of the uterus) **goes through cyclical changes** where it **thickens** by becoming more vascular and glandular in preparation for the implantation of the fertilised ovum.
- ✓ If no fertilisation of the ovum occurs, the endometrium is expelled during menstruation.



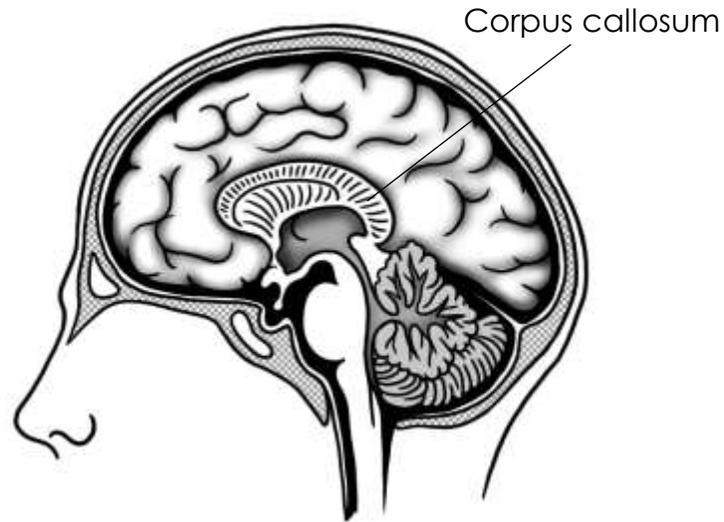
Continue learning – corpus callosum vs corpus luteum



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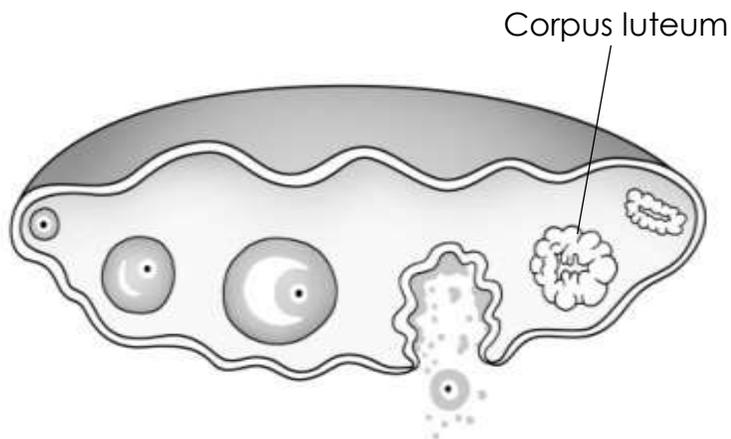
COMMONLY CONFUSED TERMS – Corpus callosum and corpus luteum

Extract from *The Answer Series*
Grade 12 Life Sciences Part 1 p. 13 & 39



Corpus callosum

- ✓ Found in the **brain**.
- ✓ The corpus callosum is a **C-shaped structure between the two hemispheres** of the cerebrum.
- ✓ It consists of **white matter**, composed of myelinated axons, that connects the two cerebral hemispheres
- ✓ It **conducts impulses between the two hemisphere** of the cerebrum to allow **communication** to occur between them.



Corpus luteum

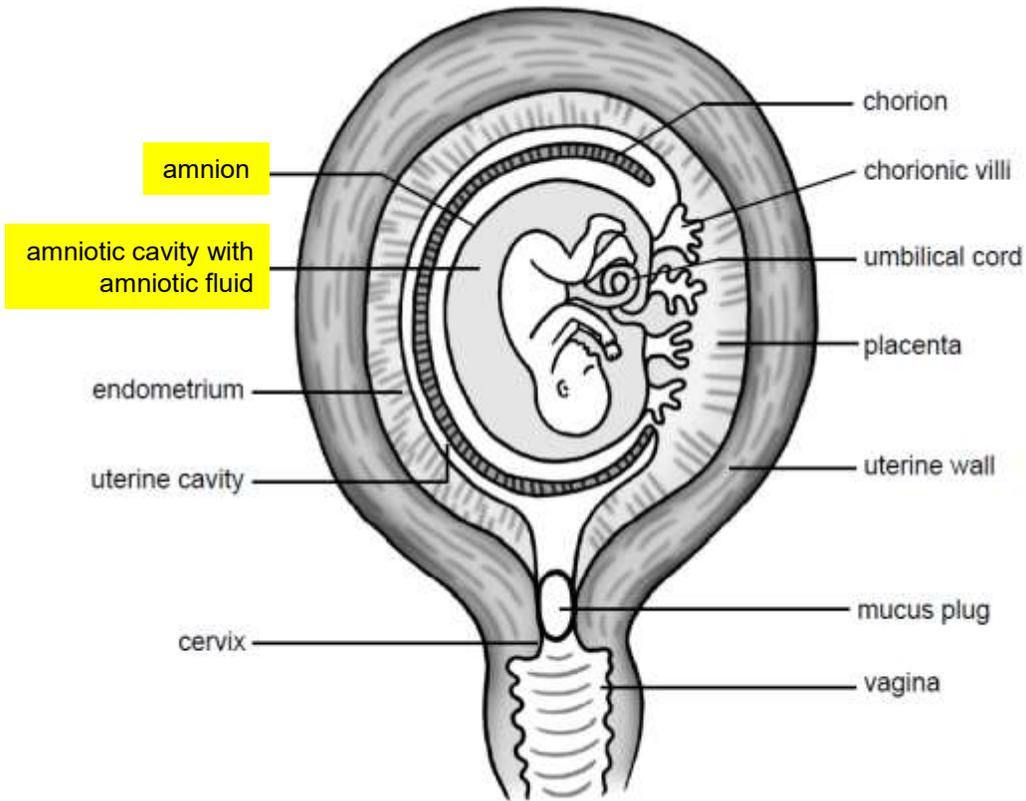
- ✓ Found in the **ovaries** (after ovulation).
- ✓ The **remnants of the Graafian follicle** after ovulation.
- ✓ A **yellow mass of cells** that **secretes progesterone** during the second half of the menstrual cycle.

 Continue learning – amnion vs amniotic fluid

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COMMONLY CONFUSED TERMS – Amnion and amniotic fluid

Extract from *The Answer Series*
Grade 12 Life Sciences Part 1 p. 27



Developing foetus enclosed by embryonic membranes (amnion and chorion)

Amnion

- ✓ The amnion is a **tough, extra-embryonic membrane** lining the chorion and surrounding the foetus.
- ✓ The amnion **encloses** the **amniotic cavity**, which is **filled with amniotic fluid**.

Amniotic fluid

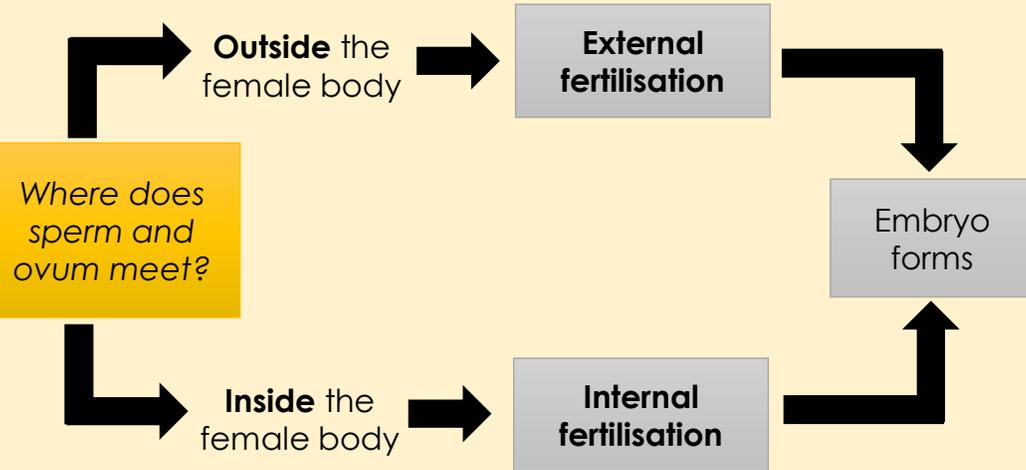
- ✓ Located inside the amniotic cavity (inside the amnion).
- ✓ **Contains water** as well as **discarded foetal cells, waste products** and **micro-organisms**.
- ✓ It provides the **watery medium** in which the foetus can **freely move** and develop.
- ✓ It **protects** the foetus from **shocks, dehydration** and **temperature changes**



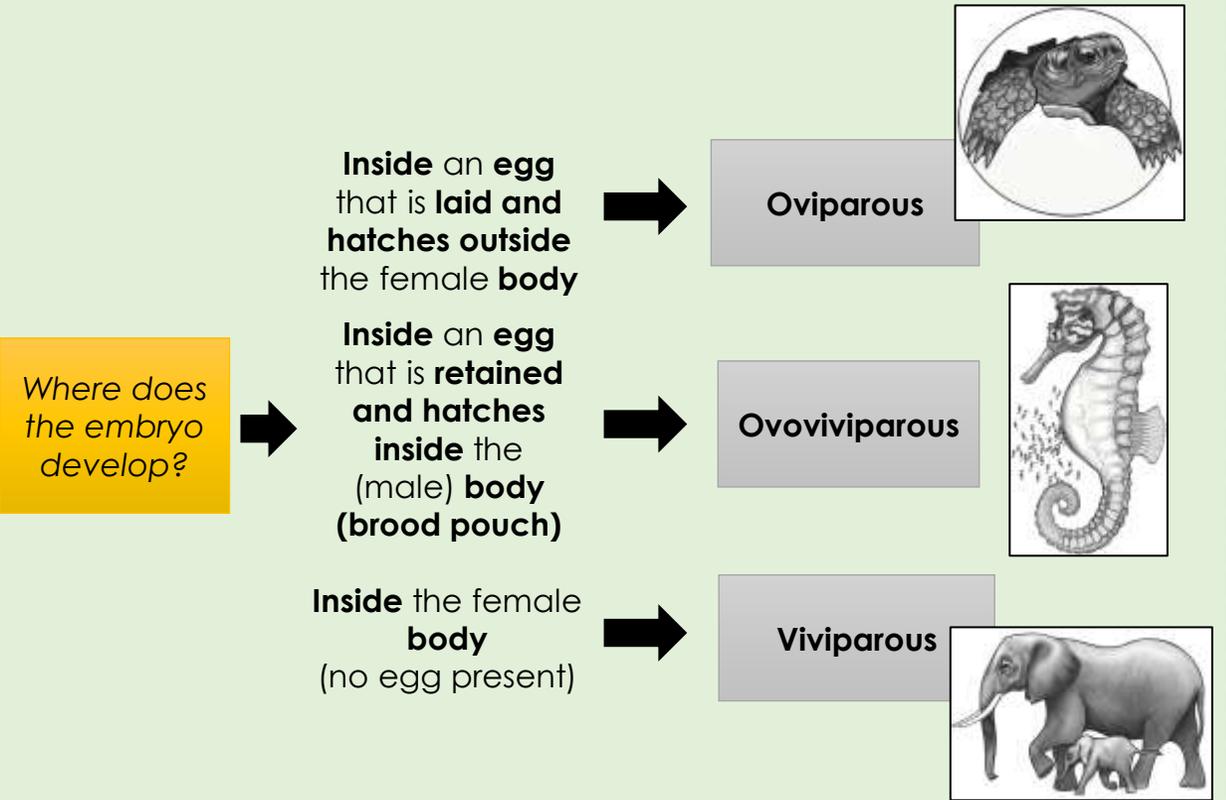
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SUGGESTIONS FOR IMPROVEMENT – Reproductive strategies

Location of fertilisation



Location of embryonic development



SUGGESTIONS FOR IMPROVEMENT – Disorders or disease states

E.g. 3.1.2

Explain why a person may die if part **C** is damaged.

1 Identify the structure and name it



2 State its function under normal circumstances



3 Describe the consequences in the absence of its function



4 Describe how the body may respond to compensate for the change (where applicable)

1 C is the medulla oblongata



2 it controls vital processes/
heartbeat/breathing/
maintaining blood pressure

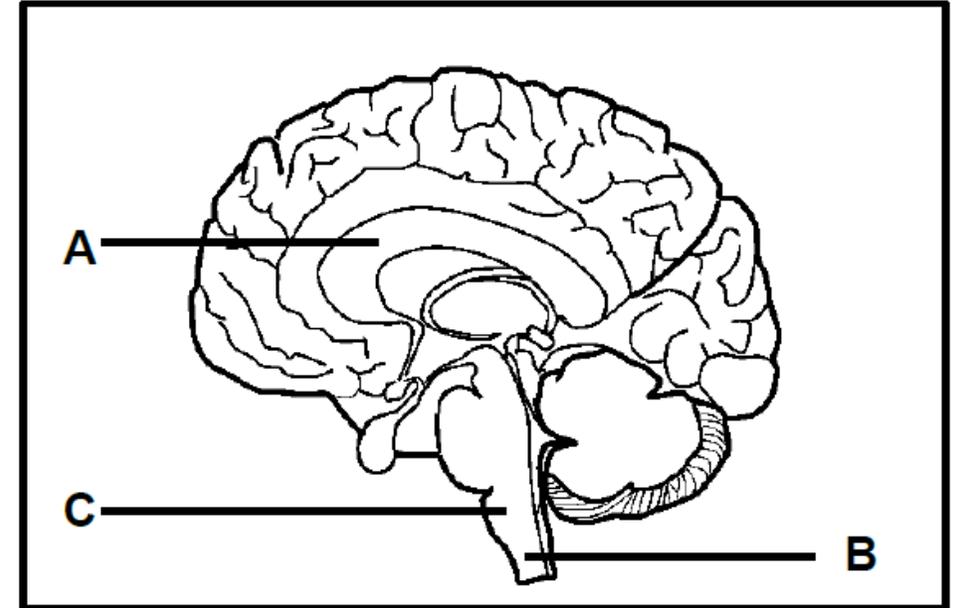


3 which will no longer occur
when it is damaged

not applicable



Let's do another one



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SUGGESTIONS FOR IMPROVEMENT – Disorders or disease states

E.g. 3.3.3

Explain why build-up of ear wax at part **A** may result in temporary hearing loss.

1 Identify the structure and name it



2 State its function under normal circumstances



3 Describe the consequences in the absence of its function



4 Describe how the body may respond to compensate for the change (where applicable)

1 A is the tympanic membrane



2 it transfers vibrations to the middle ear/ossicles



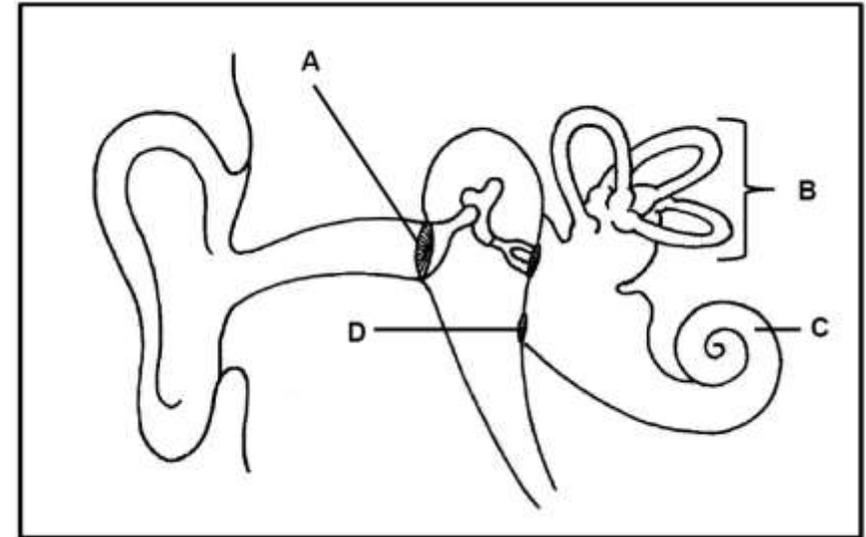
3 If blocked by ear wax it will not be able to vibrate freely

Less/no vibrations are transferred to the middle ear/ossicles

Less/no impulses are generated in the inner ear and sent to the cerebrum



4 Which may lead to temporary hearing loss



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SUGGESTIONS FOR IMPROVEMENT – Different stimuli in the ear

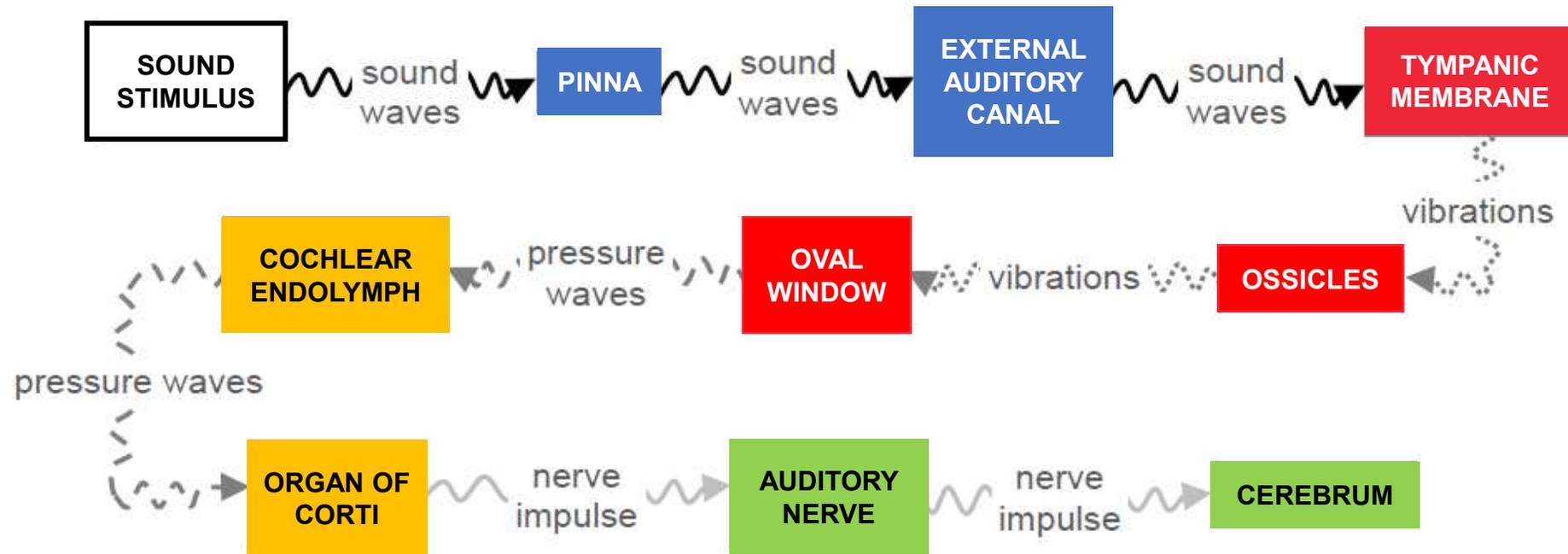
COLOUR KEY:

OUTER EAR

MIDDLE EAR

INNER EAR

NERVOUS SYSTEM



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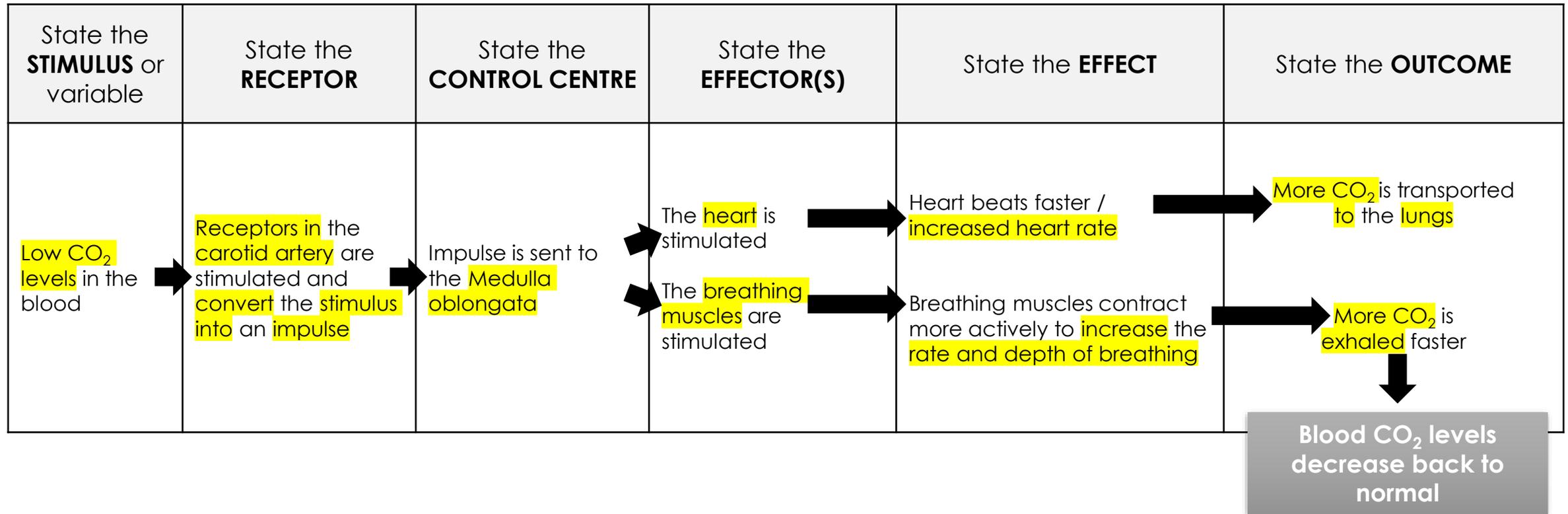


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SUGGESTIONS FOR IMPROVEMENT – Negative Feedback Mechanisms

E.g. 3.4.6

Describe the *homeostatic control* of carbon dioxide when it is high in blood.



Extract from *The Answer Series*
Grade 12 Life Sciences Part 1 p. 80



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