KWAZULU-NATAL PROVINCE

EDUCATION
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

LIFE SCIENCES P1

PREPARATORY EXAMINATION

SEPTEMBER 2025

MARKS: 150

TIME: 2½ hours

This question paper consists of 15 pages.

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INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.



1. Answer ALL the questions.
2. Write ALL the answers in the ANSWER BOOK.
3. Start the answers to each question at the top of a NEW page.
4. Number the answers correctly according to the numbering system used in this question paper.
5. Present your answers according to the instructions of each question.
6. Do ALL drawings in pencil and label them in blue or black ink.
7. Draw diagrams, tables or flow charts only when asked to do so.
8. The diagrams in this question paper are NOT necessarily drawn to scale.
9. Do NOT use graph paper.
10. You may use a non-programmable calculator, protractor and a compass.
11. Write neatly and legibly.

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SECTION A

QUESTION 1

1.1 Various options are provided as possible answers to the following questions. Choose the answer and write only the letter (A to D) next to the question number (1.1.1 to 1.1.10) in the ANSWER BOOK, for example 1.1.11 D.

1.1.1 The myelin sheath of a sensory neuron …

A conducts impulses away from the cell body.
B carries impulses towards the cell body.
C provides electrical insulation.
D ensures a one directional transmission of impulses.

1.1.2 The blind spot in the eye has …

A rods only.
B both rods and cones.
C no rods and no cones.
D cones only.

1.1.3 A boy looked at a distant kite flying up in the sky.

Which ONE of the following changes occurred in his eyes?

A Suspensory ligaments slackened and the lens became less convex
B Suspensory ligaments slackened and the lens became more convex
C Suspensory ligaments became taut, and the lens became less convex
D Suspensory ligaments became taut, and the lens became more convex

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1.1.4 Which ONE of the following statements is an INCORRECT response of the human body to an increase in the carbon dioxide levels in the blood?

A Increased heartbeat and breathing rate
B Carotid arteries in the neck are stimulated
C A message is sent to the hypothalamus
D Increased flow of blood with carbon dioxide to the lungs

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1.1.5 Which ONE of the following combinations is CORRECT for a visual defect, the nature of the defect, and it's treatment?

	VISUAL DEFECT	NATURE OF DEFECT	TREATMENT
A	Cataracts	Lens is clouded over	Cornea implant
B	Long-sightedness	Eyeball is longer than normal	Corrective lenses
C	Short-sightedness	Eyeball is shorter than normal	Corrective lenses
D	Astigmatism	Irregular shaped cornea	Surgery

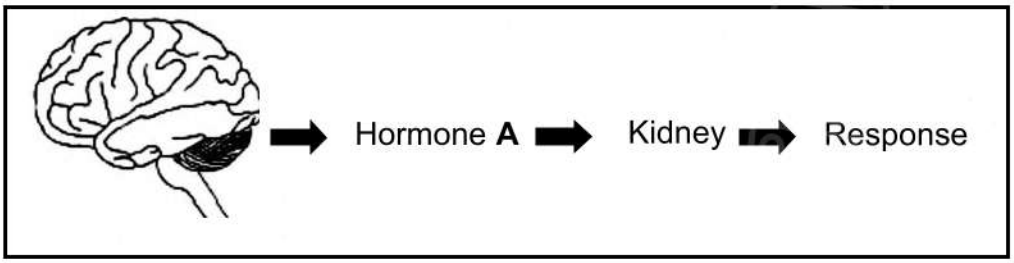
1.1.6 Below is a list of events in the regulation of salt.

(i) Less salt is reabsorbed into the blood
(ii) Less aldosterone is secreted
(iii) More salt is excreted with urine
(iv) The adrenal gland is stimulated

Which ONE of the following combinations is the CORRECT sequence in regulating high salt levels in the blood?

A (iv) → (iii) → (ii) → (i)
B (ii) → (iv) → (i) → (iii)
C (iv) → (ii) → (i) → (iii)
D (iv) → (i) → (iii) → (ii)

QUESTIONS 1.1.7 AND 1.1.8 ARE BASED ON THE DIAGRAM BELOW WHICH REPRESENTS PART OF THE NEGATIVE FEEDBACK RESPONSE THAT OCCURS WHEN A PERSON HAS LOST TOO MUCH OF WATER, WHICH IS DETECTED BY THE BRAIN.



1.1.7 The hormone **A** is …

A TSH.
B ADH.
C LH.
D FSH.

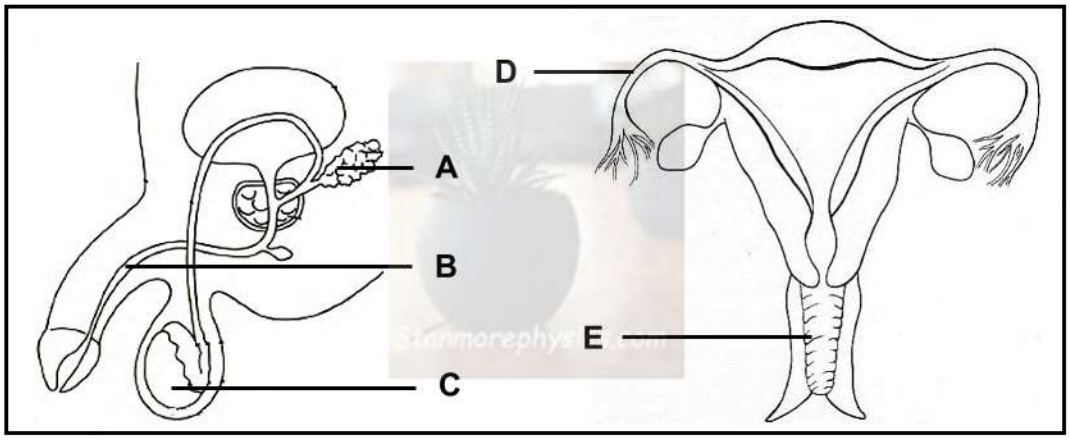
1.1.8 The **response** referred to in the diagram is that…

A less water is re-absorbed by osmosis.
B urine becoming less concentrated.
C the permeability of the collecting duct of the kidney increases.
D More water is lost with the urine.

1.1.9 Which ONE of the following combinations are involved in maintaining balance when there is a change in speed and the direction of movement of the body?

A Cristae and cerebrum
B Maculae and cerebrum
C Cristae and cerebellum
D Maculae and cerebellum

1.1.10 The diagrams below represent the male and female reproductive systems.



Which ONE of the following combinations represents the correct labels with their functions?

A **B** transports sperm cells to the vagina and **D** is responsible for implantation
B **C** stores sperm cells and **E** serves as a passage during childbirth
C **A** provides nutrients for sperm cells and **D** is the site of fertilisation
D **B** transports semen and **A** produces testosterone

(10 x 2) **(20)**

1.2 Give the correct **biological term** for each of the following descriptions. Write only the term next to the question numbers (1.2.1 to 1.2.9) in the ANSWER BOOK.

1.2.1 Part of the male reproductive system that stores sperm cells

1.2.2 A growth response of part of a plant in response to an external stimulus

1.2.3 The membranes that protect the brain

1.2.4 The ductless glands that release their secretions directly into the bloodstream

1.2.5 A structure in the eye that absorbs light to prevent internal reflection

1.2.6 A plant growth pattern where lateral branch growth is inhibited by auxins

1.2.7 The ability of the eye to adjust the curvature of the lens to allow for near and distant vision

1.2.8 A brain disorder characterised by the degeneration of the myelin sheaths of neurons

1.2.9 The division of the autonomic nervous system that slows down the heart rate

(9 x 1) **(9)**

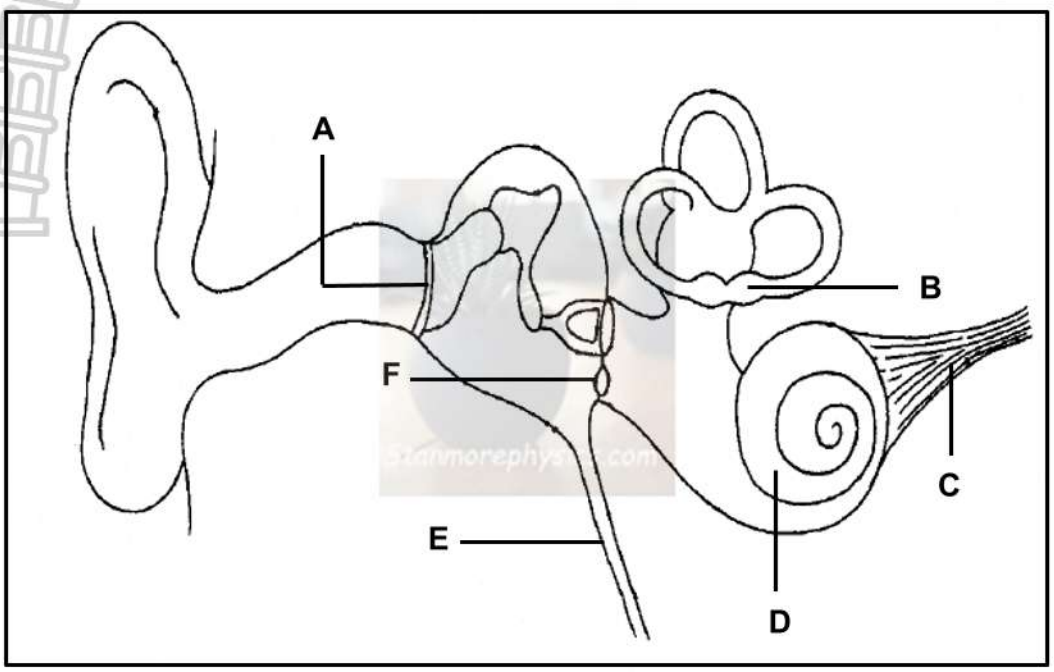
1.3 Indicate whether each of the descriptions in COLUMN I applies to **A ONLY**, **B ONLY**, **BOTH A AND B or NONE** of the items in COLUMN II. Write **A only**, **B only**, **both A and B,** or **none** next to the question number (1.3.1 to 1.3.3) in the ANSWER BOOK.

	COLUMN I	COLUMN II
1.3.1	The membrane that allows for gaseous exchange in the amniotic egg	A: Allantois B: Chorion
1.3.2	A rapid, involuntary response to a stimulus	A: Reflex arc B: Reflex action
1.3.3	The hormone that promotes stem elongation at the internodes	A: Abscisic acid B: Gibberellins

(3 x 2) **(6)**

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1.4 The diagram below represents the structure of the human ear.



1.4.1 Write down the LETTER and NAME of the part that:

(a) Equalises pressure on either side of part **A** (2)

(b) A grommet is surgically inserted to treat a middle ear infection (2)

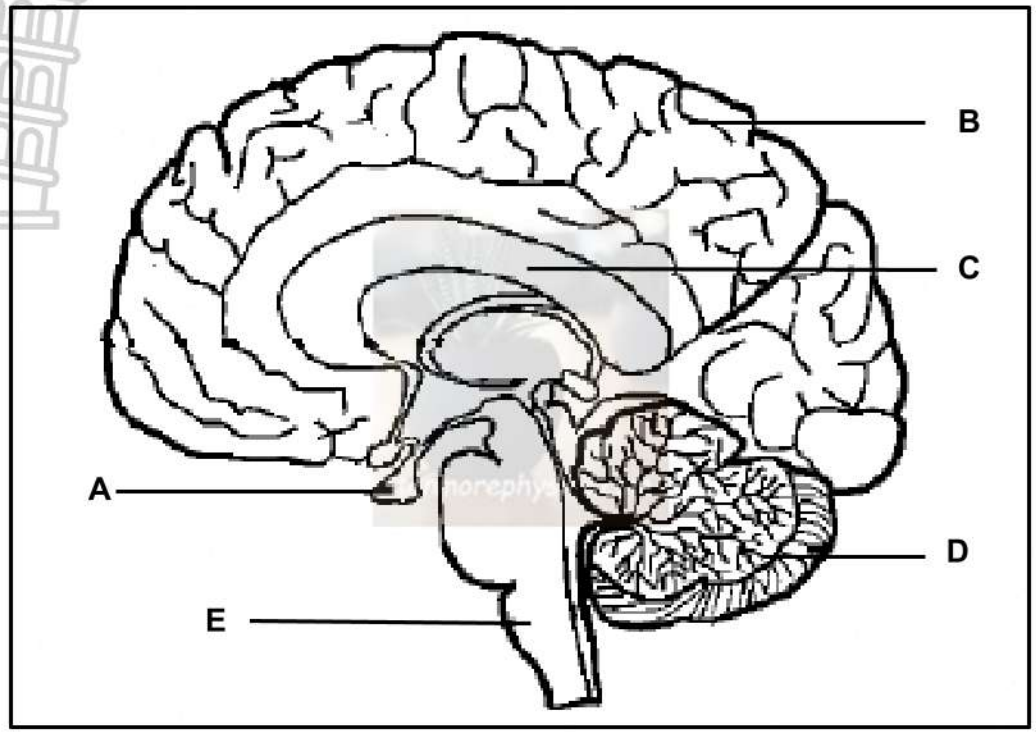
(c) Contains receptors to maintain balance when there is a change in speed and direction of the body (2)

(d) Absorbs pressure from the inner ear (2)

1.4.2 Name the receptors that are found in part **D**. (1)
(9)

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1.5 The diagram below represents the structure of the human brain.



1.5.1 Identify part:

(a) **A** (1)

(b) **B** (1)

(c) **C** (1)

1.5.3 A person suffered a brain injury after severe encephalitis (inflammation of the brain tissue). The heartbeat was normal, but occasional loss of hearing and loss of co-ordination of the skeletal muscles was experienced.

Write down the LETTER of the part that:

(a) Is affected as the skeletal muscles lost co-ordination (1)

(b) Is affected as hearing is lost (1)

(c) Ensures the normal heartbeat of the person (1)
(6)

TOTAL SECTION A: [50]

SECTION B

QUESTION 2

2.1 Read the passage below:

> During the mating ritual of seahorses, the female deposits her eggs in the male's pouch. The male then releases his sperms into the same pouch. Fertilisation occurs inside the pouch. The male seahorse cares for the developing eggs and protects them inside the pouch.
>
> When the seahorses are ready to be born, the male contracts muscles in his abdomen to expel the fully developed offspring into the water. The parent seahorses do not look after their offspring.

2.1.1 Name the type of:

(a) Fertilization displayed by seahorses (1)

(b) Development as a reproductive strategy shown by seahorses (1)

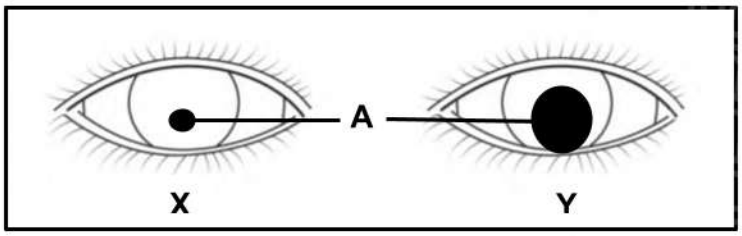
2.1.2 Give ONE reason for your answer in QUESTION 2.1.1 (a) (1)

2.1.3 From the passage, state ONE way in which seahorses increase the chances of fertilisation. (1)

2.1.4 The seahorse is ovoviviparous.

Explain ONE possible advantage in the development of the offspring in the ovoviviparous seahorse as compared to an oviparous animal. (2)
(6)

2.2 The diagram below represents the eye under different light conditions.



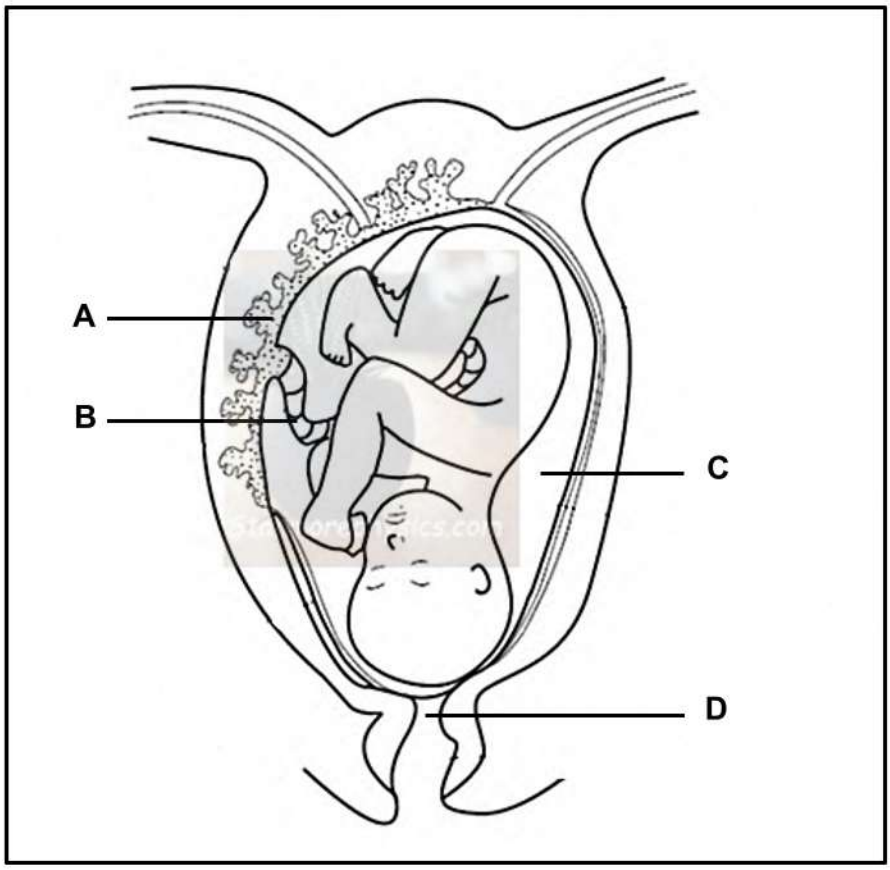
2.2.1 Name the mechanism in which the eye adjusts in response to the stimulus of light. (1)

2.2.2 Identify the diagram (**X** or **Y**) which represents the eye in bright light conditions. (1)

2.2.3 Describe how the change occurs in part **A** from diagram **X** to **Y**. (3)
(5)

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2.3 The diagram below represents a developing foetus in a female reproductive system.



2.3.1 Identify part:

(a) **C** (1)

(b) **D** (1)

2.3.2 State TWO functions of the part identified in QUESTION 2.3.1 (a). (2)

2.3.3 Explain:

(a) TWO ways in which part **A** protects the developing foetus. (4)

(b) Why structure **B** should not be blocked during the development of the foetus. (4)
(12)

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2.4 An investigation was conducted to determine the change in the ovarian hormone levels in the blood during the menstrual cycle.

The results are shown in the table below.

	CONCENTRATION OF OVARIAN HORMONES IN THE BLOOD (ng/mL)	
TIME (DAYS)	HORMONE X	HORMONE Y
3	0.7	2
6	0.8	8
9	1.2	18
12	2	24
15	18	16
18	25	14
21	18	10
24	12	6
27	6	5
30	2	4

2.4.1 Identify hormone:

(a) **X** (1)

(b) **Y** (1)

2.4.2 Ovulation took place soon after day 12.

Use evidence from the table above to explain this statement. (2)

2.4.3 Based on the information in the table, describe what will happen in the lining of the uterus from day 3 to 9. (2)

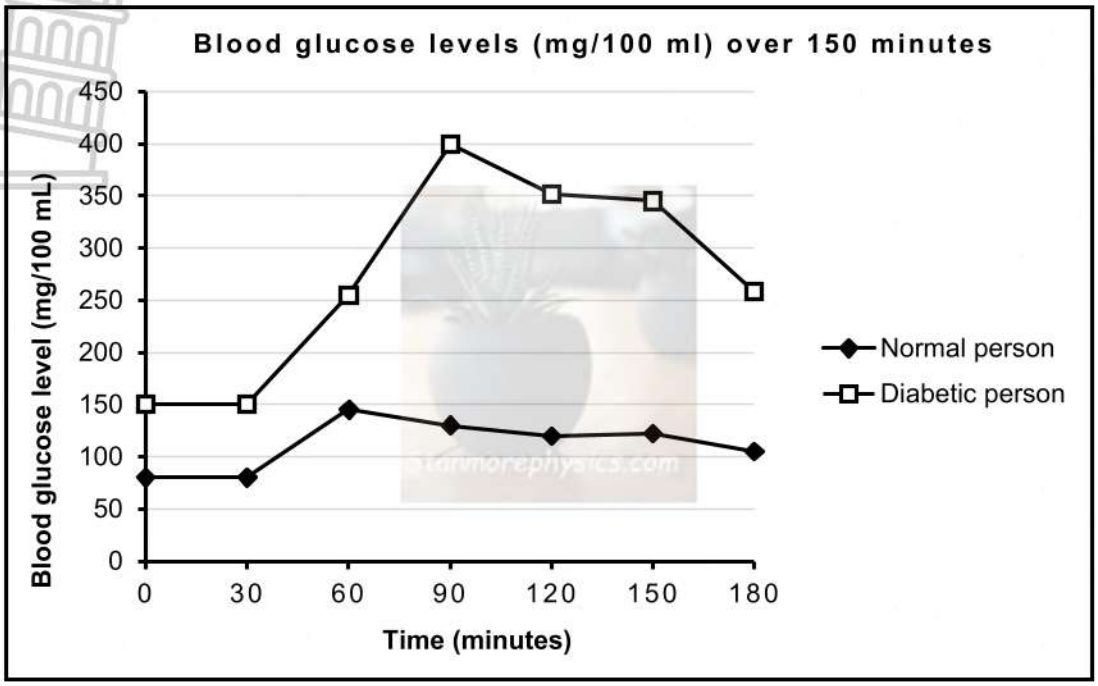
2.4.4 Explain why the level of hormone **X** should remain high if fertilization occurs. (3)

2.4.5 Draw two line graphs on the same set of axes to show the level of the two hormones (**X** and **Y**) over the first fifteen days. (6)

(15)

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2.5 The graphs below show the blood glucose levels of a normal person and a diabetic person. Both were injected with a concentrated glucose solution at 30 minutes.



2.5.1 How many minutes after the injection of the glucose solution did the blood glucose in the normal person reach its highest level? (1)

2.5.2 By how many mg/100 mL did the glucose level of the diabetic person increase between 60 and 150 minutes? Show ALL working. (2)

2.5.3 Explain the reason for the higher levels of glucose in a diabetic person. (2)

2.5.4 Describe the relationship between blood glucose level and time in a normal person from 90 to 150 minutes. (3)

2.5.5 Explain how the normal person responded to high levels of blood sugar after the ingestion of the glucose solution. (4)

(12)

[50]

QUESTION 3

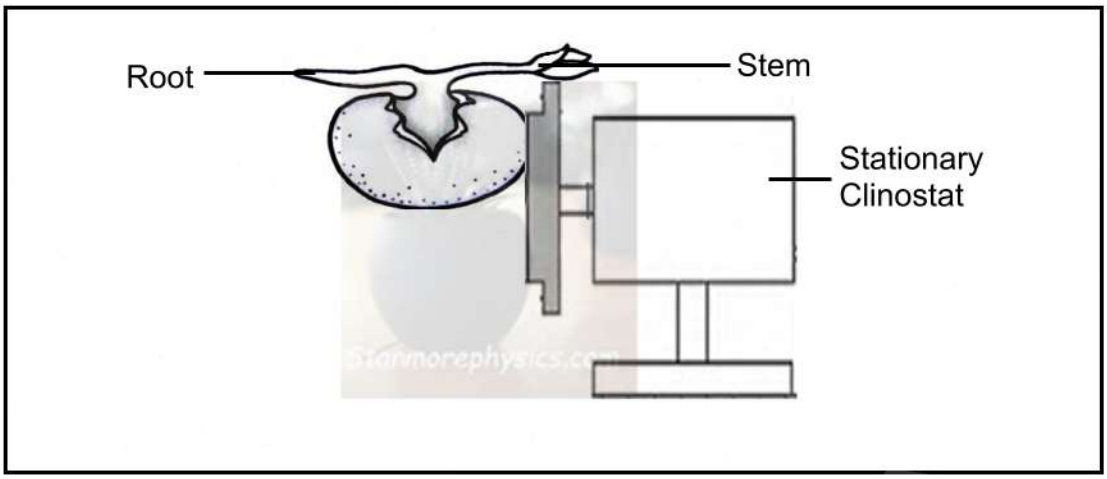
3.1 Some people are allergic to certain foods, insect bites or medication. The best treatment for an allergic reaction is an intravenous (into the bloodstream) injection of adrenalin (the hormone of "fight or flight").

3.1.1 Name the gland that secretes adrenalin. (1)

3.1.2 Explain why adrenalin is administered intravenously as an injection instead of as orally. (2)

3.1.3 Explain why the blood vessels of the muscles dilate during the "fight or flight" response. (2)
(5)

3.2 The diagram below shows a germinating seed on a stationary clinostat with the root in a horizontal position. The apparatus was left in a dark room.



3.2.1 Name the type of tropism that will be displayed by the stem. (1)

3.2.2 Describe the effect of the hormone produced at the tip of the root in this investigation. (5)

3.2.3 A rotating clinostat overcomes the effect of gravity.

Explain the difference in the results of this investigation if it was set up on a rotating clinostat. (3)
(9)

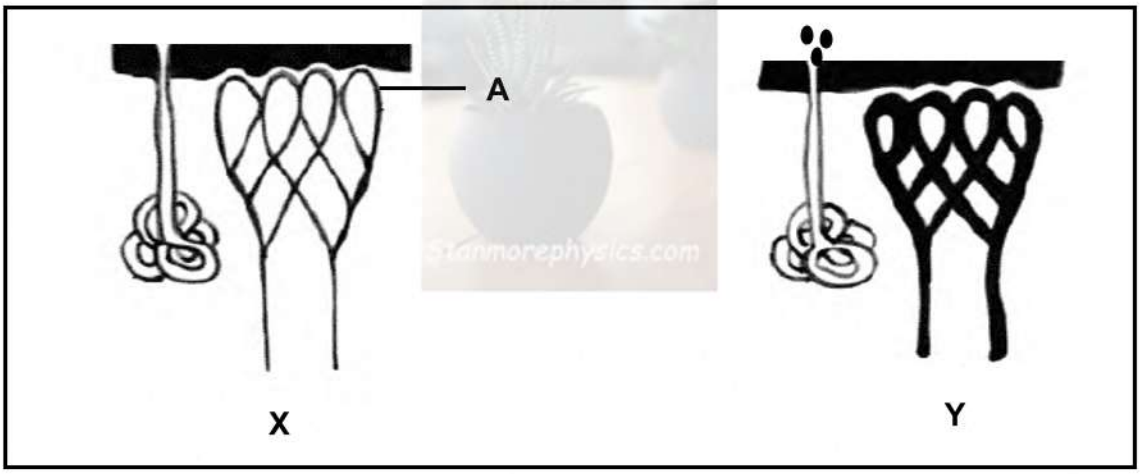
3.3 A group of boys were walking barefooted across a grassy field. One of the boys heard a hissing sound coming from ahead of him, causing him to step backwards onto a sharp stone.

3.3.1 Describe how the boy was able to hear the hissing sound. (7)

3.3.2 Draw a labelled diagram of the neuron that transmits the impulse from the central nervous system to the boy's foot. (4)

3.3.3 Describe the pathway of the impulse that brings about a rapid response after the boy steps onto the sharp stone. (5)
(16)

3.4 The diagrams below represent a section of the internal structure of the skin under different environmental conditions.



3.4.1 Define the term *homeostasis*. (2)

3.4.2 Identify the diagram (**X** or **Y**) that shows the body's response to a high temperature. (1)

3.4.3 Give TWO observable reasons for your answer in QUESTION 3.4.2. (2)

3.4.4 Explain the role of part **A,** in maintaining the body's temperature, under the environmental condition in diagram **X**. (3)
(8)

3.5 A male contraceptive pill containing a chemical substance that inhibits the production of testosterone has been produced for a number of years.

An investigation was conducted to determine the influence of the contraceptive pill on male fertility.

The procedure of the investigation was as follows:

- 600 healthy, male volunteers were chosen
- The sperm count of each volunteer was measured at the beginning of the investigation
- Each volunteer was then given 500 mg of the contraceptive pill monthly for 12 months
- All volunteers were asked to wear loose-fitting trousers and underwear made of the same light fabric over the period of the investigation
- The sperm count of each volunteer was determined weekly, for 24 months, by measuring the number of healthy sperm per ml of semen

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3.5.1 Identify the dependent variable in this investigation. (1)

3.5.2 State how the dependent variable in QUESTION 3.5.1 was measured. (1)

3.5.3 Identify TWO:

(a) Factors that were kept constant during the investigation (2)

(b) Ways in which the reliability of the results of the investigation was increased (2)

3.5.4 Explain the effect on males when they use the contraceptive pill, that inhibits testosterone production. (3)

3.5.5 State ONE reason why the sperm count was still monitored 12 months after the contraceptive pill was stopped. (1)

3.5.6 A sperm count of below 15 million sperm per milliliter of semen is considered low and is known as Oligospermia.

Explain how a sperm count of 1.2 million sperm per milliliter of semen will affect male fertility. (2)

(12)

[50]

TOTAL SECTION B: 100

GRAND TOTAL: 150

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