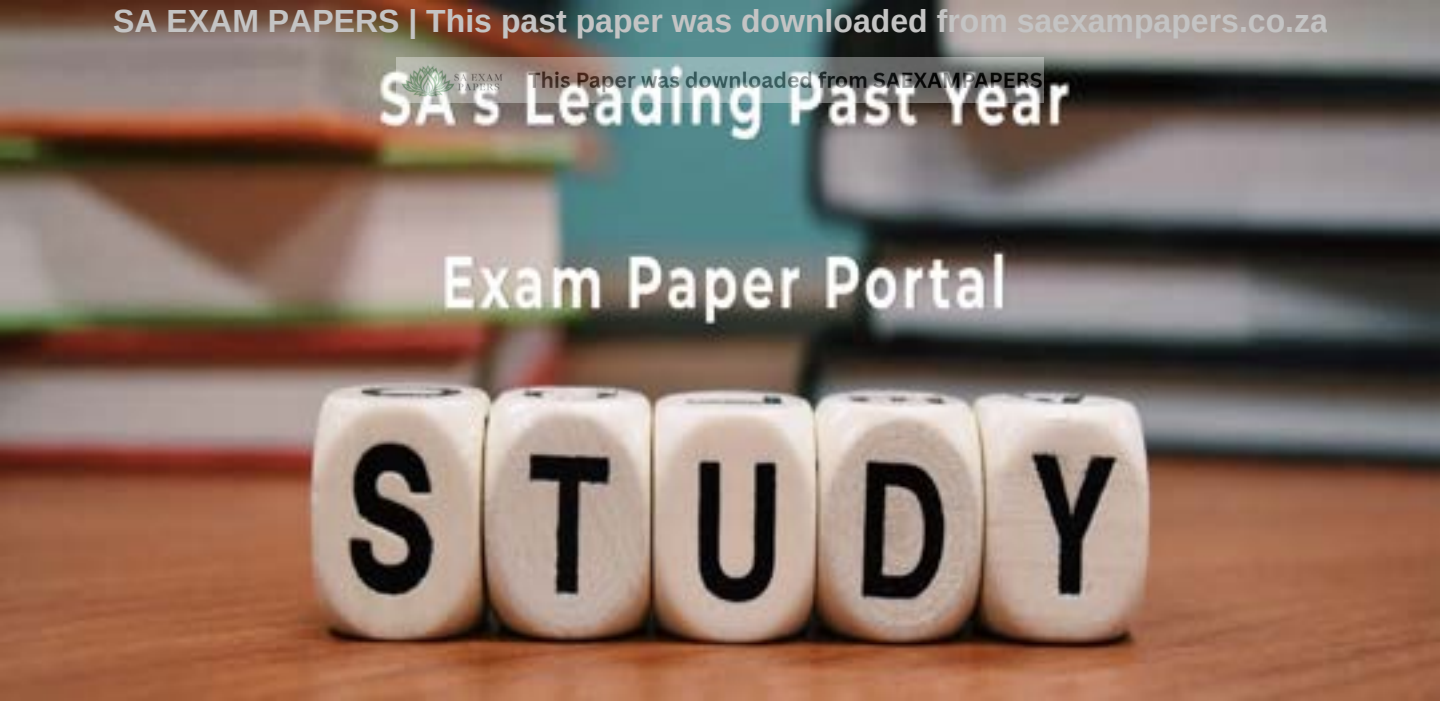


KWAZULU-NATAL PROVINCE

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.

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.

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 on a sensory neuron ...

A conduct impulses away from the cell body.
B carry impulses towards the cell body.
C provides electrical insulation.
D ensure one directional transmission of the impulses.

1.1.2 The blind spot in the eye has ...

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

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

Which ONE of the following changes occurred in ~~her~~ his eyes?

A Suspensory ligaments slacken and the lens became less convex
B Suspensory ligaments slacken and the lens became more convex
C Suspensory ligaments were taut and the lens became less convex
D Suspensory ligaments were taut and the lens became more convex

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 Heart-beat and breathing rate are increased
B Carotid arteries in the neck are stimulated
C Message is sent to the hypothalamus
D Increased flow of blood with carbon dioxide to the lungs

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

	VISUAL DEFECT	NATURE	TREATMENT
A	Cataracts	Lens is clouded over	Surgery
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

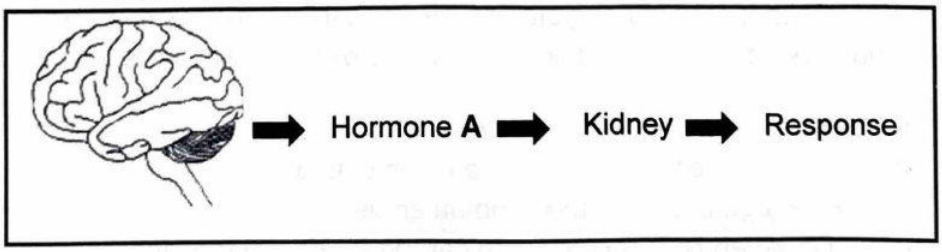
1.1.6 Below is a list of events in regulation of salts.

(i) Less salt is reabsorbed into the blood
(ii) Less aldosterone is secreted
(iii) More salt 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 (vi) → (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 WATER AND IS DETECTED BY THE BRAIN.



1.1.7 The hormone **A** is identified as ...

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

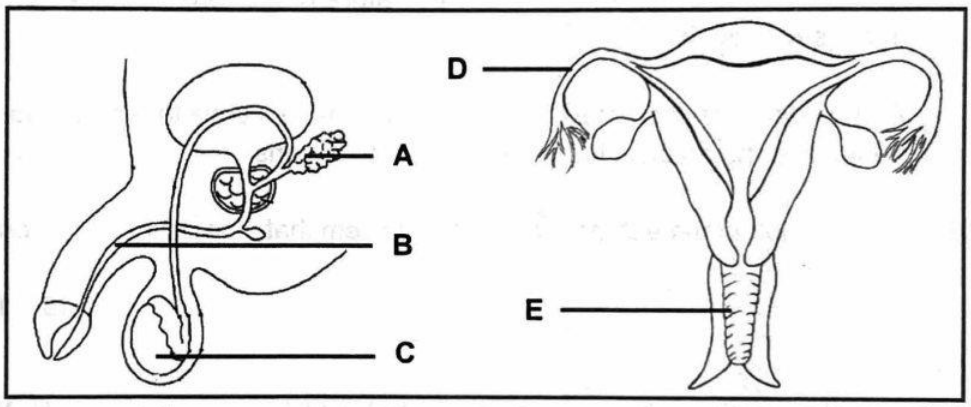
1.1.8 The **response** referred to in the diagram is ...

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

1.1.9 Which ONE of the following combinations are involved in maintaining balance when there is a change in 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 passage during child birth
C **A** provides nutrients for sperm cells and **D** is the site for fertilisation
D **B** transports the 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 the plant part 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 to be transported to the target organs

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 the 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 body's immune system attacking and destroying the myelin sheath that covers the axons

1.2.9 The division of the autonomic nervous system that slows down reactions in the body

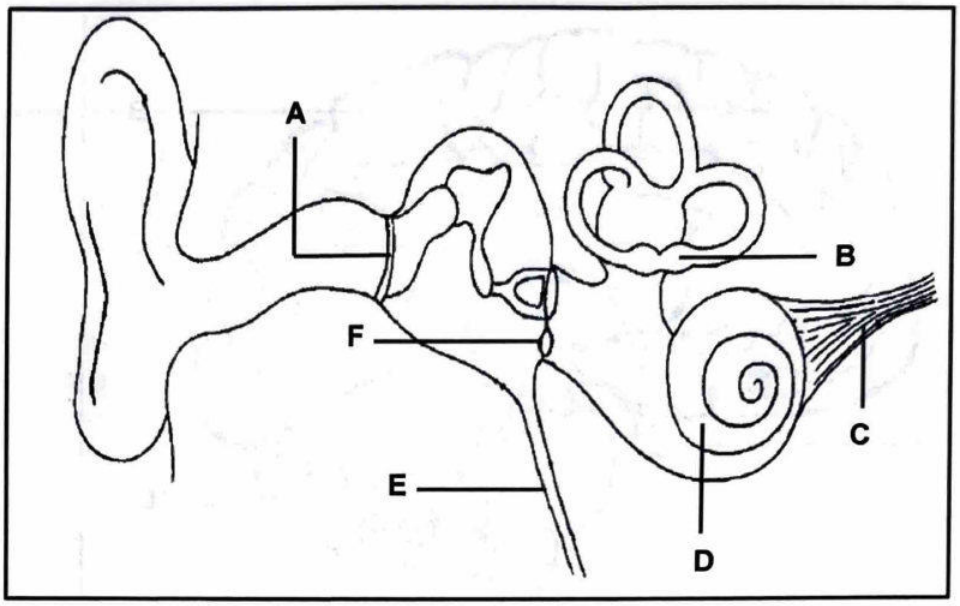
(9 x 1) **(9)**

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	Membrane that allows 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	Hormone that promotes stem elongation at the internodes	A: Abscisic acid B: Gibberellins

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

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)

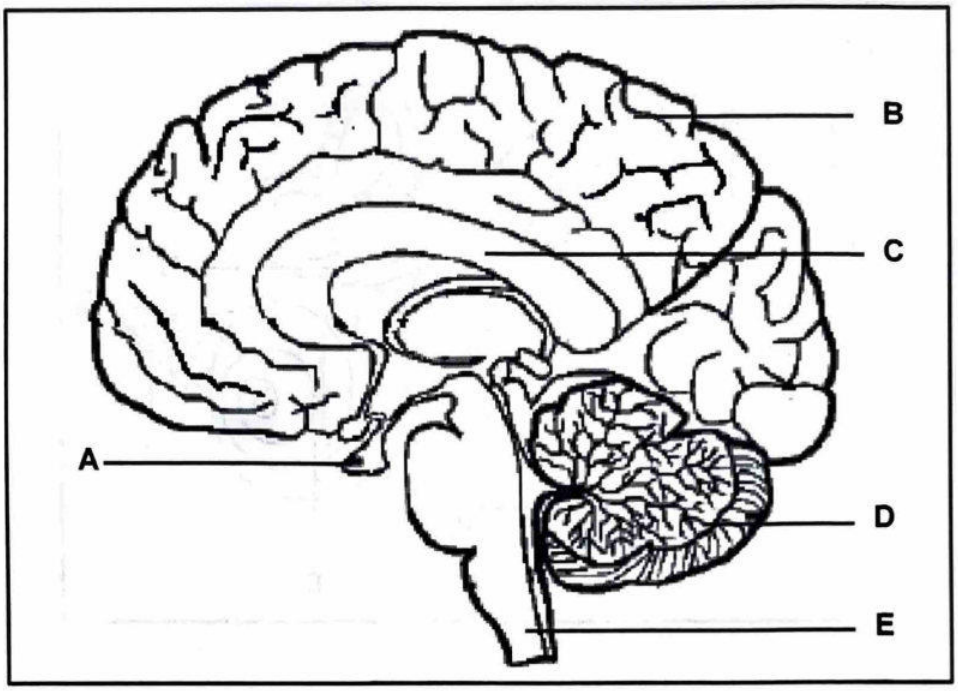
(b) A grommet is surgically inserted to treat middle ear infections (2)

(c) Contains receptors to maintain balance when there is a change in 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)

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 experienced occasional loss of hearing and co-ordination of skeletal muscles.

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. Then the male releases his sperms into the same pouch. Fertilisation occurs inside the pouch. 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)

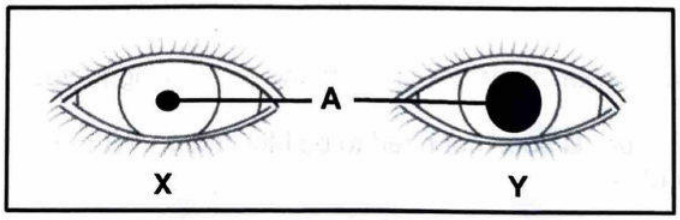
2.1.2 Give ONE reason for your answer in QUESTION 2.1.1 (a) (1)

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

2.1.4 The seahorse species is ovoviviparous.

Explain ONE possible advantage in the development of the offspring in ovoviviparous when compared to oviparous. (2)
(6)

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

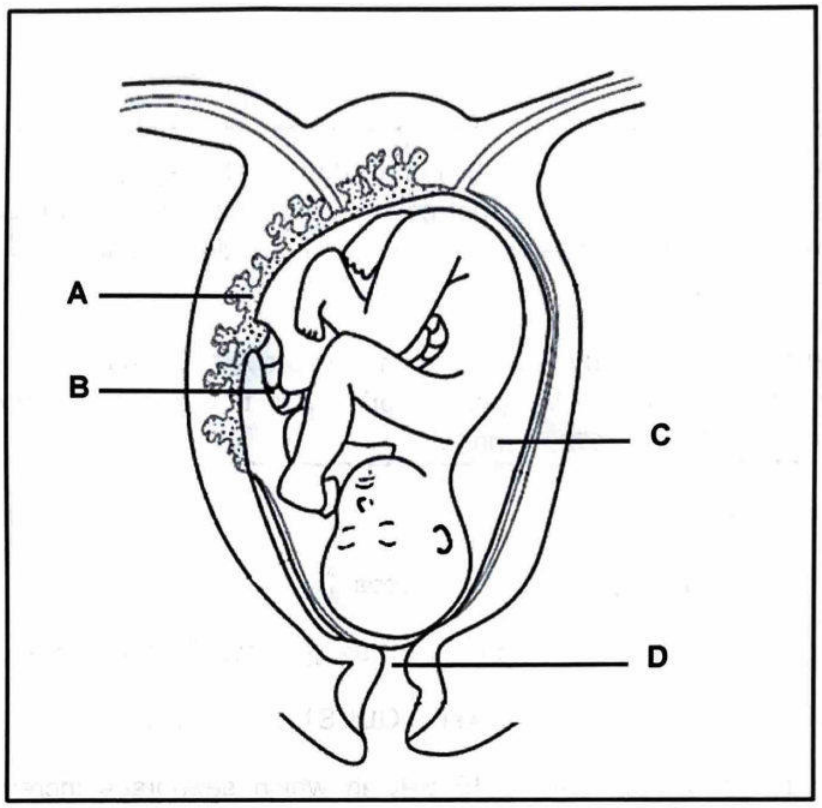


2.2.1 Name the mechanism in which the eye adjusts in response to the stimulus of light. (1)

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

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

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** does not need to be blocked during the development of the foetus. (4)
(12)

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

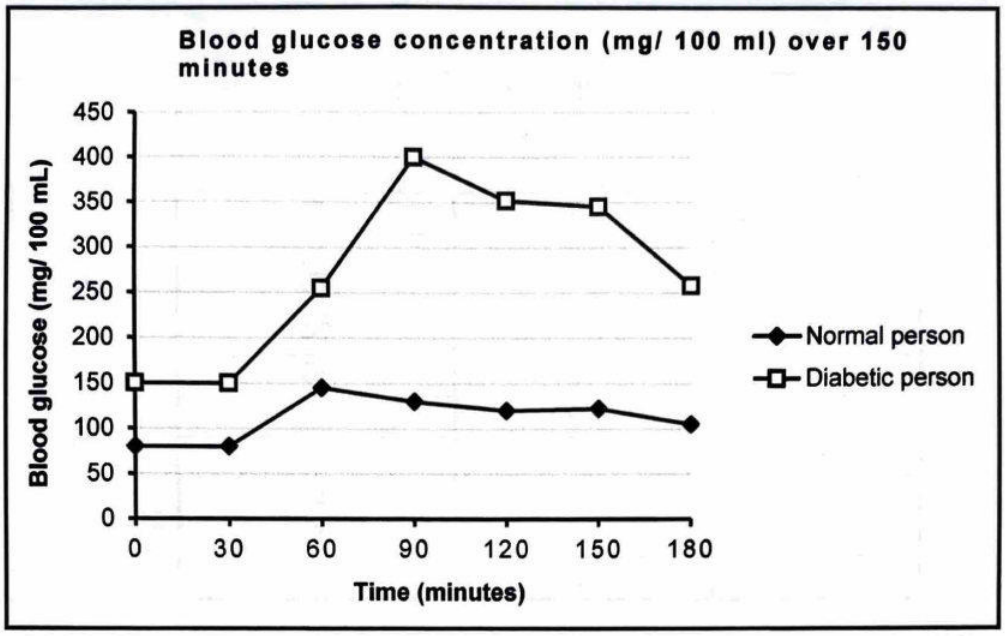
2.4.3 Based on the information in the table, describe what will happen in the lining of the uterus from day 3 to 9. (2)

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

2.4.5 Draw two-line graphs showing the first fifteen days and the two hormones (**X** and **Y**) on the same set of axes. (6)

(15)

2.5 The graph below shows the blood glucose concentration in a normal and diabetic person. Both persons were injected with the glucose solution at 30 minutes during the investigation.



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

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

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

2.5.4 Describe the relationship between the blood glucose concentration and normal person from 90 to 150 minutes. (3)

2.5.5 Explain how a normal person responded to high levels of blood sugar after the ingestion of the glucose solution. (4)
(12)
[50]

QUESTION 3

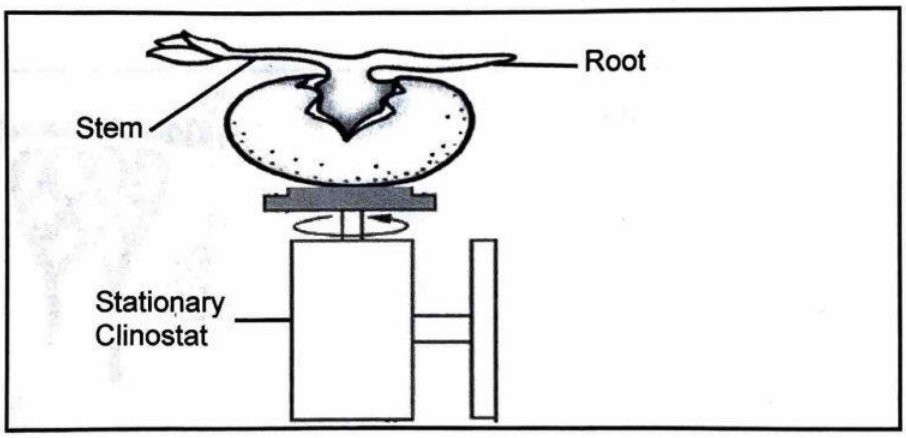
3.1 Some people are allergic to certain foods, insect bites or medication. The best treatment for an allergic reaction is an intravenous (into the bloodstream) injection of adrenalin (the hormone of "fight or flight").

3.1.1 Name the gland that secretes adrenalin. (1)

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

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

3.2 The diagram below shows a germinated seed with the root in a horizontal position.



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

3.2.2 Describe what will be 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 if this investigation was set up on a rotating clinostat. (3)
(9)

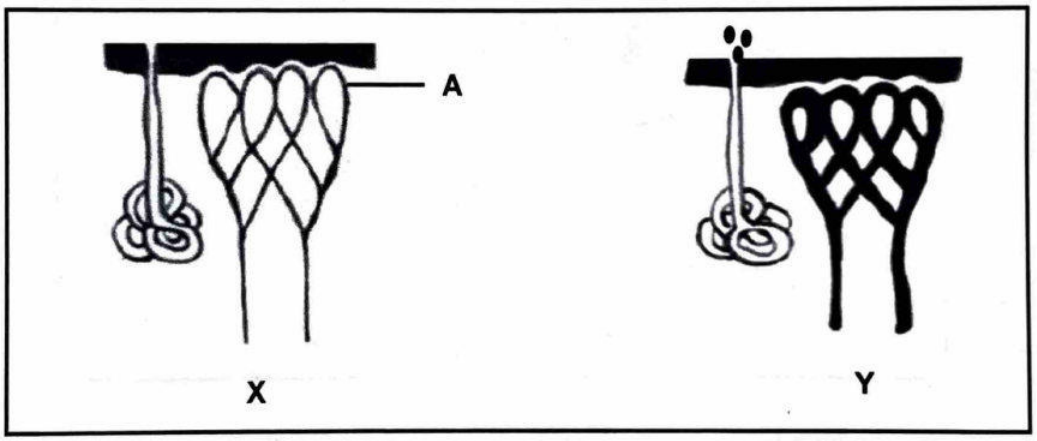
3.3 A group of boys were walking barefooted across a grassy field. One of the boys heard a hissing sound coming from ahead of him and instinctively stepped backwards, onto a sharp stone. An impulse was transmitted to the boy's brain, allowing him to respond to the stimulus of pain experienced by him when he stepped onto the 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 the response in a boy's foot after stepping onto the stone. (5)
(16)

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



3.4.1 What is meant by *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 condition as seen 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.
- A sperm count was determined for each volunteer.
- Each volunteer was given 500 mg of the contraceptive pill monthly over a period of 12 months.
- During the period of investigation, all volunteers were asked to wear loose-fitting trousers and underwear made of the same light fabric
- The number of healthy sperms per ml of semen was measured weekly over a period of 24 months
- The average sperm count per volunteer was calculated

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 was increased (2)

3.5.4 Explain what would be the effect of using the contraceptive pill that inhibits testosterone production in males. (3)

3.5.5 State ONE reason for monitoring the sperm count 12 months after the contraceptive pill have been stopped. (1)

3.5.6 Below 15 million sperm per milliliter of semen is considered low known as oligospermia.

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

(12)

[50]

TOTAL SECTION B: 100

GRAND TOTAL: 150