LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
EDUCATION

NATIONAL
SENIOR CERTIFICATE

GRADE 12

LIFE SCIENCES PAPER 1
PREPARATORY EXAMINATION
SEPTEMBER 2025

MARKS: 150

DURATION: 2½ hours

This question paper consists of 17 pages

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Please turn over

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, flow charts or tables 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 must use a non-programmable calculator, protractor and compass, where necessary.
11. Write neatly and legibly.

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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 numbers (1.1.1 to 1.1.9) in the ANSWER BOOK, e.g. 1.1.11 D

1.1.1 The influence of the terminal bud by its production of a growth hormone that inhibits the growth of lateral branches.

A apical dominance
B mitosis
C cell elongation
D cell differentiation

1.1.2 A function of the cerebrum is to…

A co-ordinate movement while walking.
B control higher thought processes.
C regulate appetite.
D control body temperature.

1.1.3 A reflex action is one that is…

A acquired after a long practice.
B controlled by the brain.
C voluntary and respond to the external stimulus.
D involuntary and respond to the external stimulus.

1.1.4 A light stimulus is converted into a nerve impulse in the…

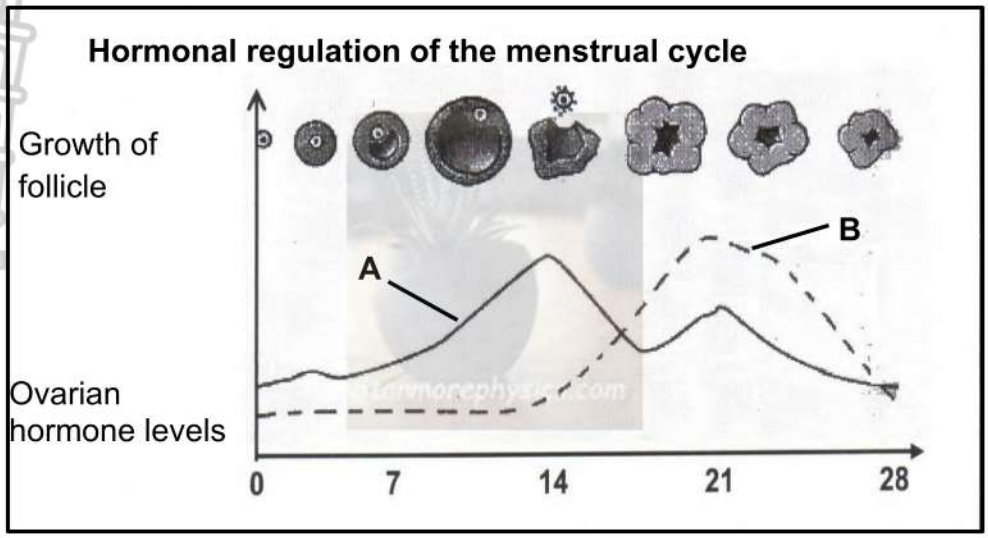
A optic nerve
B lens
C sclera
D retina

1.1.5 The sacculus and utriculus give information about the…

A condition of the skeletal muscles
B position and movement of the body
C position of the head in space
D direction of the movement of the body

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QUESTIONS 1.1.6 and 1.1.7 refer to the graph below which shows the events that take place in the ovary during the menstrual cycle.



1.1.6 Which hormones are represented by **A** and **B** respectively?

A Oestrogen and FSH
B Progesterone and LH
C FSH and LH
D Oestrogen and Progesterone

1.1.7 The process that occurs on day 14 of this cycle is called?

A Ejaculation
B Ovulation
C Copulation
D Implantation

1.1.8 A function of abscisic acid is to…

A promote cell division.
B stimulate the germination of seeds.
C promote the ageing of leaves.
D promote cell enlargement.

1.1.9 Which ONE of the following involves the development of the embryo inside the uterus of the mother?

A Incubation
B Ovovivipary
C Vivipary
D Ovipary

(9 x 2) **(18)**

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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 1.2.10) in the ANSWER BOOK.

1.2.1 The finger-like projections that develop from the extra-embryonic membrane that surrounds the embryo.

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

1.2.3 Maintenance of a constant internal environment in the human body.

1.2.4 An organ in the male reproductive system that secretes hormones.

1.2.5 The collective name of the membranes that protect the central nervous system.

1.2.6 The liquid that surrounds the human embryo.

1.2.7 A type of vision in which both eyes are used to focus on an object.

1.2.8 A device that is inserted into the tympanic membrane to treat middle ear infection.

1.2.9 The hormone in plants that is responsible for closing the stomata when a plant wilts.

1.2.10 The fusion of sperm cells and ova outside the body of a female

(10 x 1) **(10)**

1.3 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 hormone that promotes the reabsorption of salt in the kidneys	A: Aldosterone B: Adrenalin
1.3.2 A structure in the ear that absorbs excess pressure waves from the inner ear.	A: Auditory canal B: Pinna
1.3.3 Component of the peripheral nervous system	A: Cranial nerves B: Spinal nerves

(3 X 2) **(6)**

1.4 Diagram **1** below represents a reflex arc and diagram **2** represents a neuron.

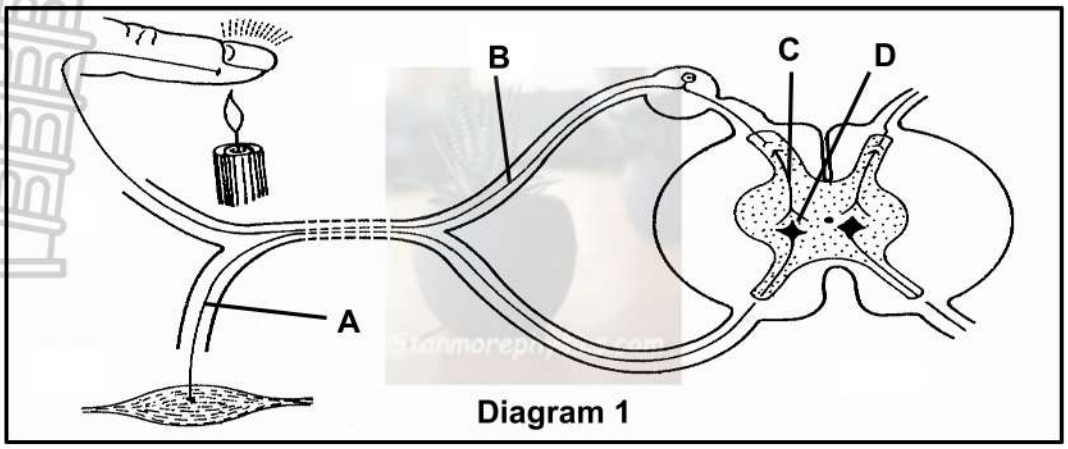


Diagram 1

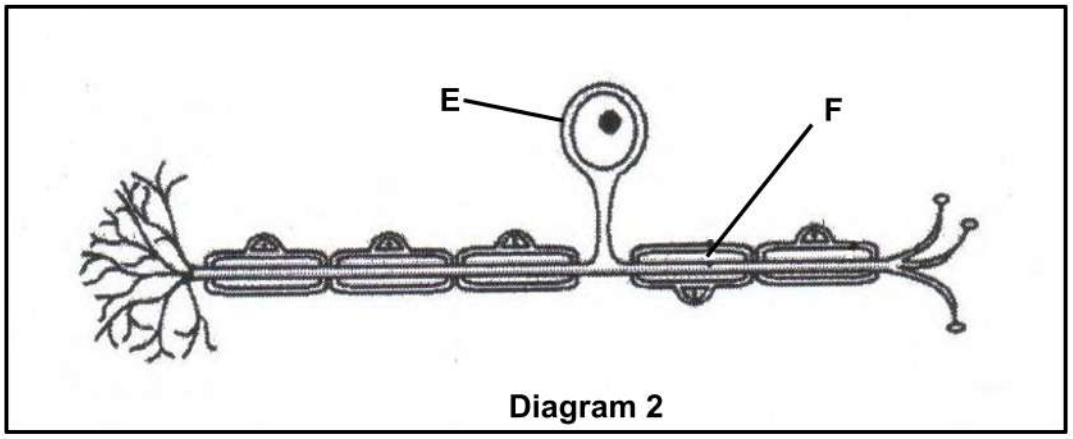


Diagram 2

1.4.1 Identify part:

(a) **C** (1)

(b) **E** (1)

1.4.2 Give the LETTER in diagram **1** that represents the type of neuron shown in diagram **2.** (1)

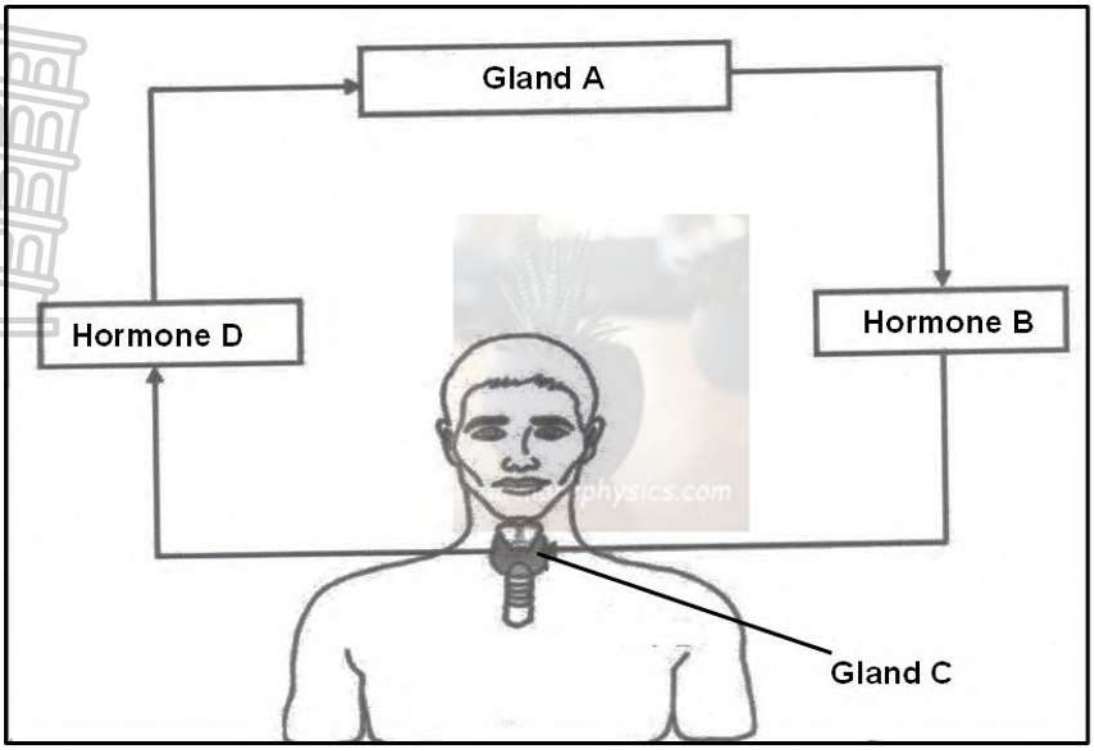
1.4.3 Give the LETTER and NAME of the part that…

(a) Ensures a one-directional flow of an impulse. (2)

(b) Is damaged when a person can feel the stimulus but cannot respond to it. (2)

1.4.4 Name TWO parts that make up the autonomic nervous system. (2)
(9)

1.5 The diagram below shows the interaction between two endocrine glands.



1.5.1 Identify:

(a) Gland **A** (1)

(b) Hormone **B** (1)

(c) Hormone **D** (1)

1.5.2 Name the interaction that takes place between hormone **B** and Gland **C**. (1)

1.5.3 Which gland (**A** or **C**) will lead to a disorder caused by the shortage of iodine in the blood? (1)

1.5.4 Name the disorder mentioned in QUESTION 1.5.3. (1)

1.5.5 Which hormone (**B** or **D**) will cause a person to become overweight when it is undersecreted. (1)

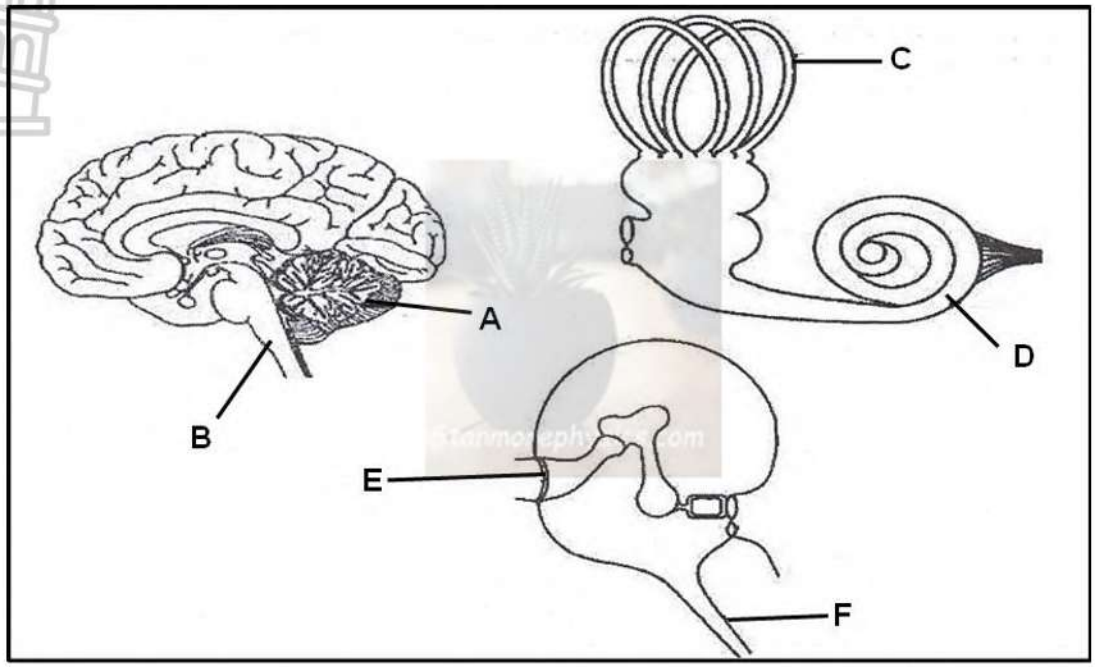
(7)

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 The diagrams below represent parts of the brain and the ear.



2.1.1 Identify part:

(a) **A** (1)

(b) **D** (1)

2.1.2 Give the LETTER and NAME of the part that equalises pressure on both sides of the tympanic membrane. (2)

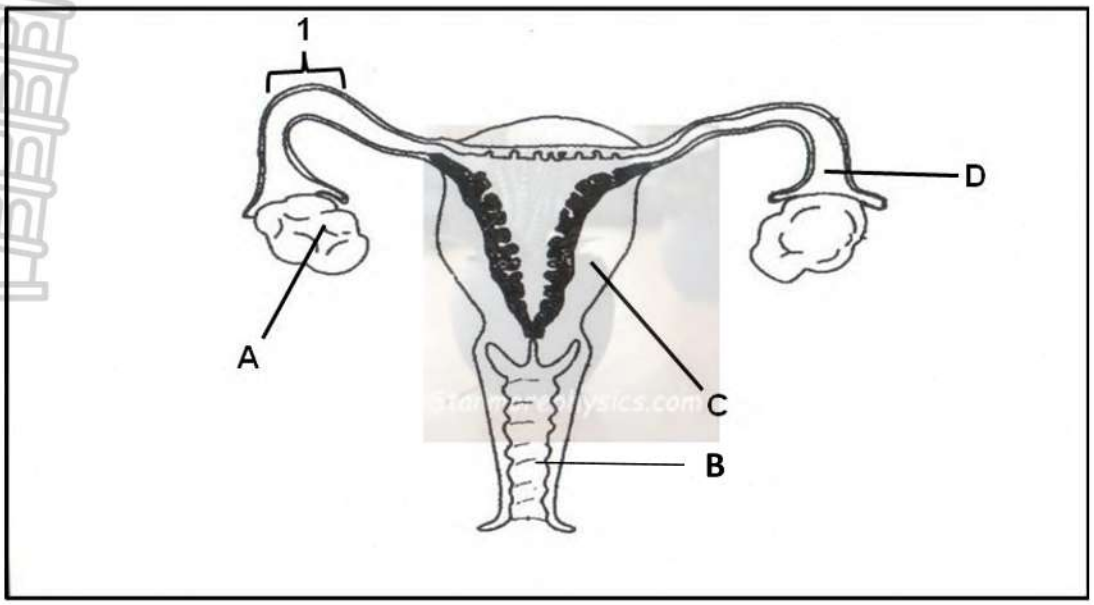
2.1.3 Explain why damage to part **B** can lead to instant death. (2)

2.1.4 Describe how part **A** responds to impulses received from part **C** (3)

2.1.5 Describe how an increased production of mucus in the nose and throat may lead to the bursting of the tympanic membrane. (3)

(12)

2.2 The diagram below represents the female reproductive system.



2.2.1 Give the LETTER and NAME of the part where:

(a) Acids are neutralised by the secretions of the prostate gland. (2)

(b) The zygote will be formed. (2)

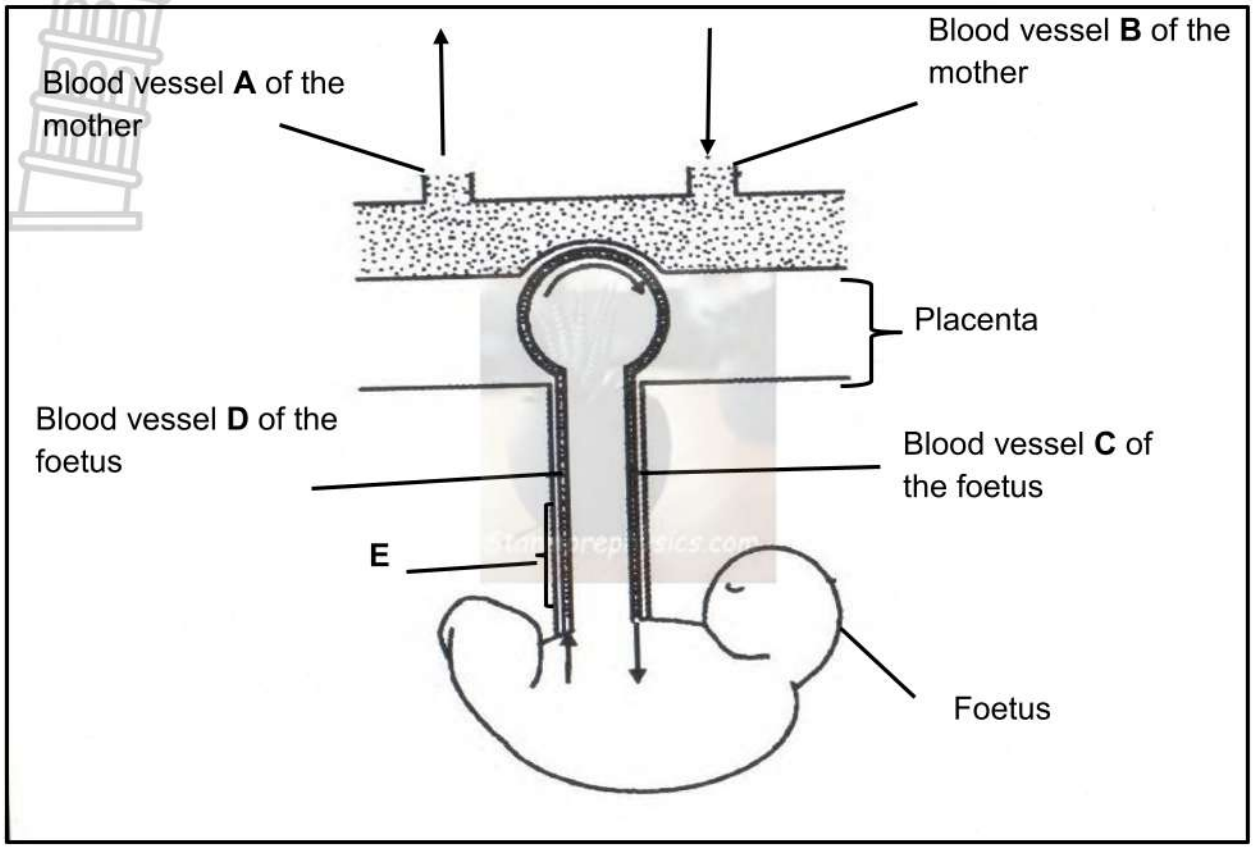
2.2.2 State TWO functions of part **C**. (2)

2.2.3 Fertilisation usually takes place at area **1**, why will blockage at this point not necessarily lead to infertility? (2)

(8)

2.3 Name and describe the process that is responsible for the production of male gametes. **(4)**

2.4 The diagram below represents the relationship between the blood system of the foetus and that of the mother. The arrows indicate the direction of blood flow in the blood vessels.



2.4.1 Identify structure **E.** (1)

2.4.2 State TWO functions of the placenta apart from diffusion of substances from the mother's blood to the foetus' blood, and vice versa. (2)

2.4.3 Tabulate TWO differences between the composition of blood found in blood vessel **C** and blood found in blood vessel **D**. (5)

2.4.4 Explain ONE consequence for the foetus if blood vessel **D** becomes blocked preventing blood flow. (2)

(10)

2.5 Read the extract of an article below.

> *Hypermenorrhoea* is a medical term used to describe periods that have unusually heavy or long-lasting bleeding. While many women might get worried about heavy periods, *Hypermenorrhoea* is more serious and not as common.
>
> Some signs of this condition include soaking blood through one or more pads every hour for several hours in a row, bleeding that lasts longer than seven days, passing large blood clots, and having to limit normal daily activities because of the heavy flow.
>
> One possible cause of *Hypermenorrhoea* is when the ovaries do not release an egg during the menstrual cycle. When this happens, the body doesn't make enough of the hormone called progesterone, which usually helps control how much you bleed. Without enough progesterone, the bleeding can become heavier and last longer than usual.

2.5.1 Give TWO symptoms of *Hypermenorrhoea* from the passage. (2)

2.5.2 Explain why this condition causes non-production of progesterone. (2)

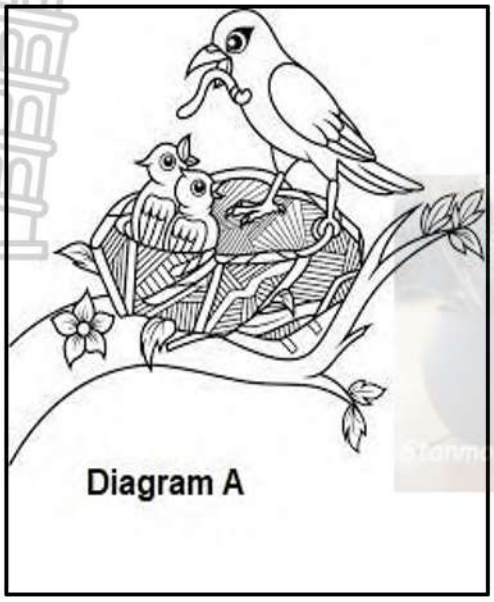
2.5.3 Explain why the symptoms mentioned in the passage may lead to tiredness in a female with *Hypermenorrhoea*. (3)

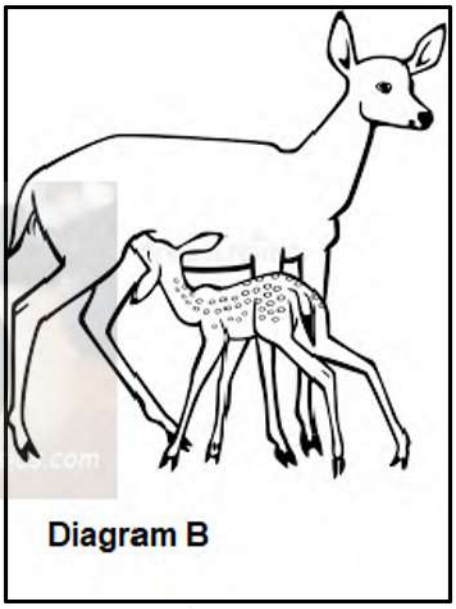
2.5.4 A female who doesn't have the condition mentioned in the passage, is given an injection high in progesterone before her menstrual cycle starts. Explain the effect on the ovarian cycle. (3)

(10)

2.6 The diagrams below represents organisms with different reproductive strategies.

…





2.6.1 Name the type of egg produced by the organism in diagram **A**. (1)

2.6.2 Which diagram (**A** or **B**) represents organisms where extra-embryonic membranes develop to assist with the protection and nutrition of the embryo. (1)

2.6.3 Name the type of developmental strategy shown by the organism in diagram **B**. (1)

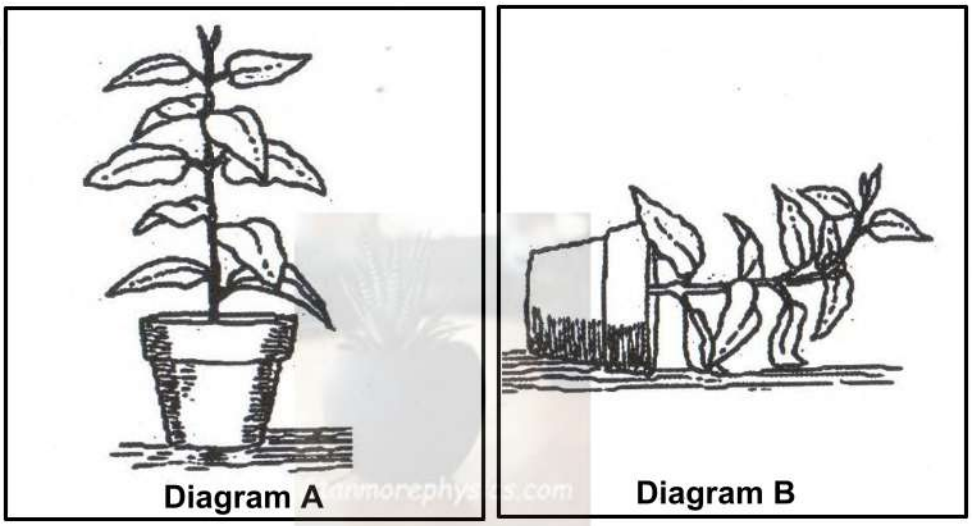
2.6.4 State THREE reasons for your ANSWER in 2.6.3. (3)

(6)

TOTAL QUESTION 2: 50

QUESTION 3

3.1 Diagram **A** shows an upright pot plant. Diagram **B** shows the same pot plant one week after falling over. The plant was exposed to uniform light from all directions before and after falling over.



3.1.1 Name the type of tropism shown in diagram **B**. (1)

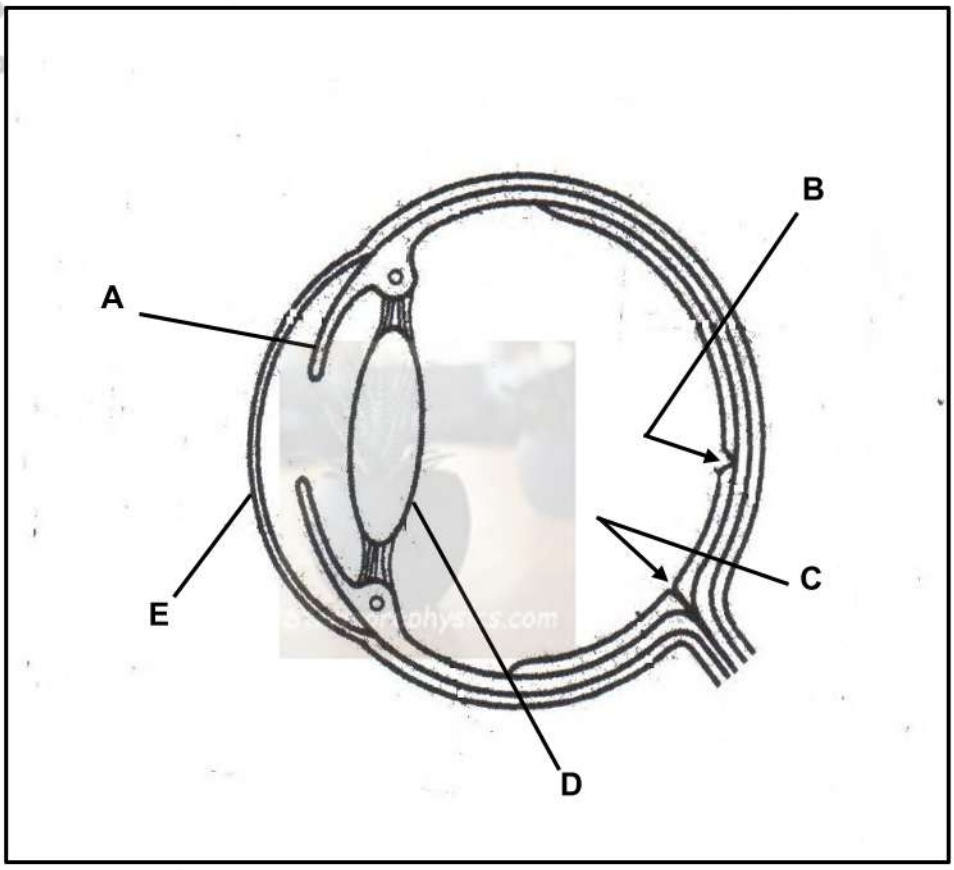
3.1.2 Explain why the stem of the plant in diagram **B** bent upwards. (4)

3.1.3 Explain the advantage that the upward bending of the stem could have for the plant. (2)

3.1.4 State how the roots in diagram **B** would react. (1)

(8)

3.2 The diagram below shows the human eye



3.2.1 Identify structure **E**. (1)

3.2.2 Explain how the construction of structure **A** enables it to perform its function effectively. (3)

3.2.3 Explain how the sight of a person will be affected if cataracts developed in part **D**. (2)

3.2.4 Describe the structural difference between area **B** and **C**. (2)

3.2.5 Define the eye defect: "short-sightedness" (myopia) (2)

3.2.6 Name and describe the process that takes place when a person is looking at a car that is moving 10 metres away from him. (6)

(16)

3.3 An investigation was conducted to compare the glucose concentration in the blood of two people, Anastacia and Ashley, before and after ingesting glucose.

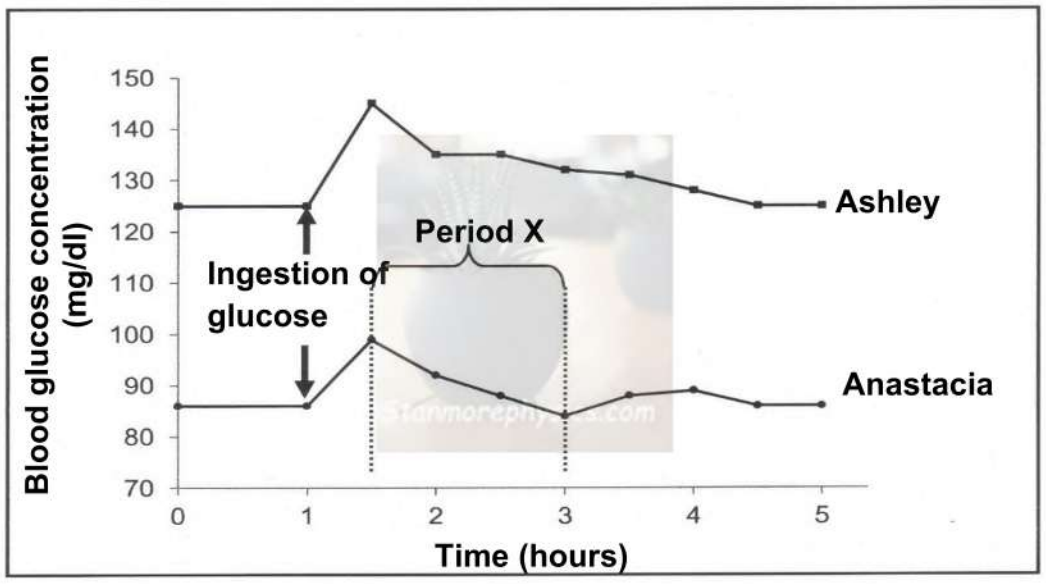
The following procedure was followed:

- The glucose concentration in their blood was measured at the start of the investigation and again 1 hour into the investigation.
- One hour into the investigation each of them was given 50 ml of a glucose solution to drink.
- For the next 4 hours after ingesting the glucose solution the glucose concentration was measured every 30 minutes.

The results are shown in the graph below.

The arrows indicate when they drank the glucose solution.

NOTE: The normal glucose concentration is between 70 and 100 mg/dl



3.3.1 Name the gland that secretes the hormones that regulate the glucose level in the blood. (1)

3.3.2 Provide a suitable caption for this graph. (2)

3.3.3 By how much did Ashley's blood glucose concentration level increase after drinking the glucose solution? Show ALL working. (2)

3.3.4 How long did it take Anastacia's blood glucose concentration level to return to its original level after ingesting the glucose solution? (1)

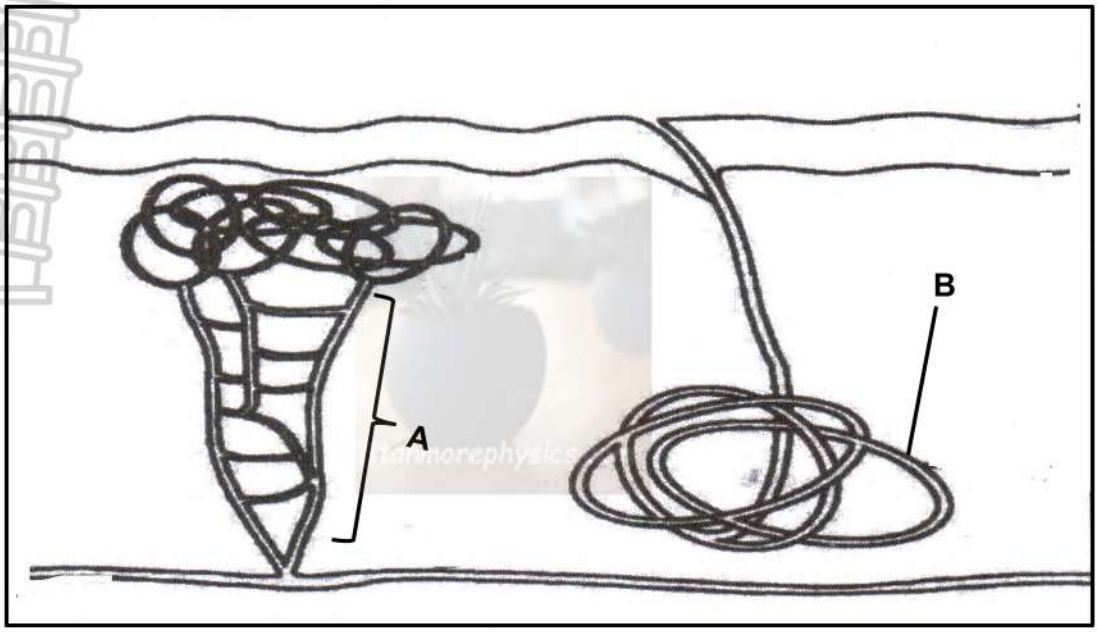
3.3.5 Who (Ashley or Anastacia) has diabetes mellitus? (1)

3.3.6 Give ONE observable reason for your answer to QUESTION 3.3.5. (1)

3.3.7 Explain the changes in Anastacia's glucose level during period **X**. (4)

(12)

3.4 The diagram below represents part of the human skin.



3.4.1 Why is part **B** classified as an exocrine gland? (1)

3.4.2 Describe how structure **A** functions during thermoregulation on a cold day. (3)

3.4.3 Explain why the temperature needs to be kept constant in the human body. (2)

(6)

3.5 An investigation was carried out to determine the influence of alcohol on the volume of urine produced.

12 healthy, 20 year-old females of similar height and mass participated in the investigation.

The investigation was conducted as follows:

- The women were divided into two groups of six each, Group **A** and Group **B**.
- The two groups ate the same food and did the same exercise for the 24 hour period before testing.
- Each group was given the following to drink after the 24 hour period:
  - Group **A**: 1 litre of alcohol-free beverage (drink that does not contain alcohol).
  - Group **B**: 1 litre of alcoholic beverage.

Assume that the volume of urine collected is equal to the volume of urine produced.

TIME OF COLLECTION	AVERAGE VOLUME OF URINE COLLECTED (ml)	
	GROUP A	GROUP B
After 1 hour	599	643
After 2 hours	413	504
After 3 hours	112	132

3.5.1 In this investigation name the:

(a) Independent variable. (1)

(b) Dependent variable. (1)

3.5.2 How did the investigators ensure the reliability of this investigation? (1)

3.5.3 How did the investigators ensure the validity of this investigation? (1)

3.5.4 Based on the results, explain how the intake of alcohol influences the secretion of ADH and consequently the volume of urine that is produced by the kidneys. (4)

(8)

TOTAL QUESTION 3: 50

TOTAL SECTION B: 100

GRAND TOTAL: 150

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