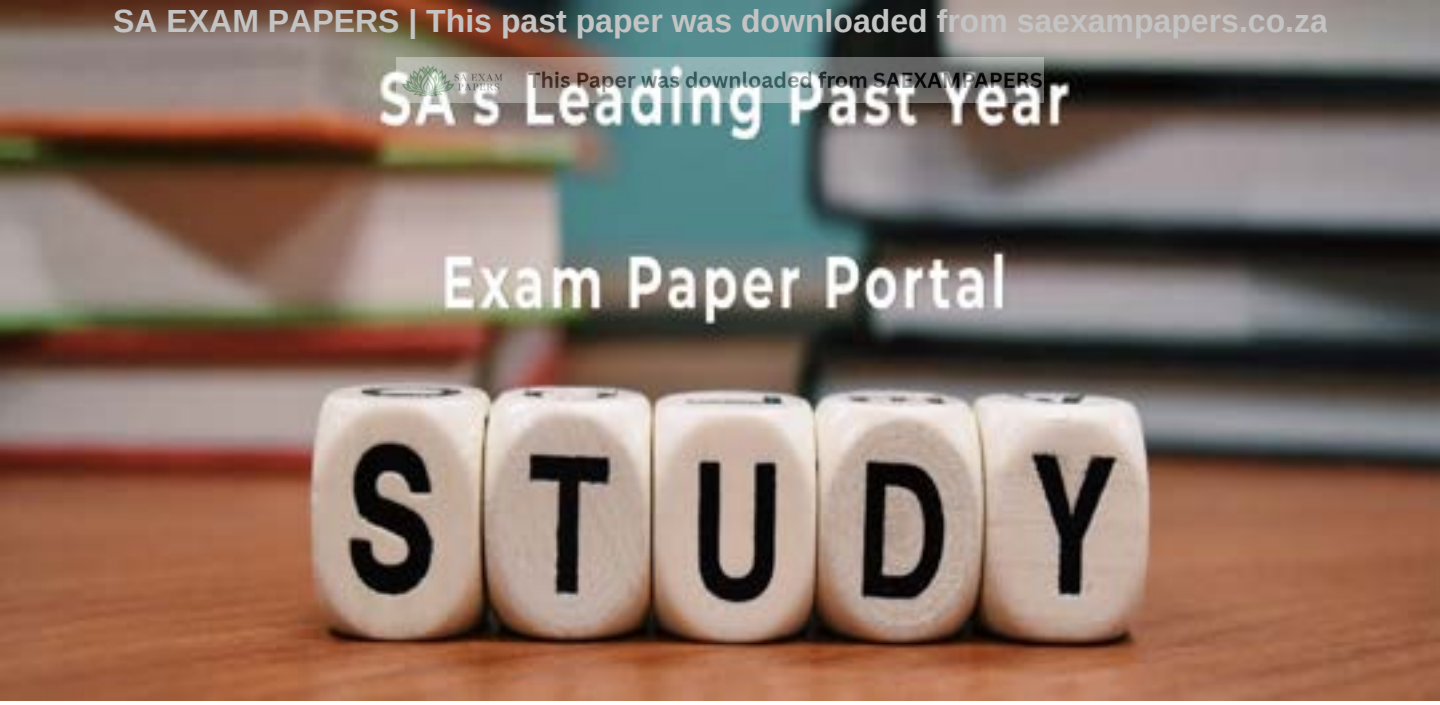

DEPARTMENT OF EDUCATION
DEPARTEMENT VAN ONDERWYS
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PROVINSIALE VOORBEREIDENDE EKSAMEN/ PROVINCIAL PREPARATORY EXAMINATION

GRAAD/GRADE 12

LEWENSWETENSKAPPE/LIFE SCIENCES

VRAESTEL/PAPER 1

SEPTEMBER 2025

PUNTE/MARKS: 150

TYD/TIME: 2½ uur/hours

Hierdie vraestel bestaan uit 16 bladsye.
This question paper consists of 16 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 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 must use a non-programmable calculator, protractor and a compass, where necessary.
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–D) next to the question numbers (1.1.1 to 1.1.10) in the ANSWER BOOK, e.g. 1.1.11 D.

1.1.1 The hormone responsible for the regulation of the salt content in the human body is …

A testosterone.
B aldosterone.
C prolactin.
D glucagon.

1.1.2 The plant hormone(s) that can be used to kill broad-leaved weeds are …

A abscisic acid only.
B absicisic acid and gibberellins.
C auxins only.
D abscisic acid and auxins.

1.1.3 Which ONE of the following effects occurs under the influence of adrenalin?

A Decreased blood pressure
B An increased blood supply to the digestive system
C An increased blood supply to the skeletal muscles
D Decreased muscle tone of skeletal muscles.

1.1.4 Which part of the ear contains the receptors for balance?

A Semi-circular canals
B Oval window
C Tympanic membrane
D Cochlea

1.1.5 Which ONE of the following is a function of amniotic fluid?

A Protects the foetus from temperature changes
B Transports oxygen to the developing foetus
C Produces progesterone and oestrogen
D Diffusion of dissolved nutrients from the mother to the foetus

1.1.6 During a reflex action, impulses enter the spinal cord via the …

A sensory neuron through the dorsal root of the spinal nerve.
B sensory neuron through the ventral root of the spinal nerve.
C interneuron through the ventral root of the spinal nerve.
D interneuron through the dorsal root of the spinal nerve.

1.1.7 An investigation was conducted to determine the effect of alcohol on reaction time.

The procedure was as follows:

- Fifty volunteers were selected.
- The volunteers' reaction time was measured at the beginning of the investigation.
- They were each given alcohol to drink.
- Their reaction times were measured again after 30 minutes.

The following factors were considered during the investigation:

(i) Age of volunteers
(ii) Number of volunteers
(iii) The amount of alcohol taken in
(iv) Tool used to measure reaction time

Which combination of factors will affect the validity of the investigation?

A (i) and (ii) only
B (i), (iii) and (iv) only
C (ii), (iii) and (iv) only
D (i), (ii), (iii) and (iv)

1.1.8 Which ONE of the following is a stage in human embryonic development?

A Choroid
B Amnion
C Chorion
D Morula

1.1.9 Grommets are used in the treatment of …

A deafness.
B blindness.
C middle-ear infections.
D multiple sclerosis.

1.1.10 A person produces a smaller volume of urine because …

A ADH levels are low in the blood and the renal tubules are more permeable to water.
B ADH levels are high in the blood and the renal tubules are less permeable to water.
C ADH levels are high in the blood and the renal tubules are more permeable to water.
D ADH levels are low in the blood and the renal tubules are less permeable to water.

(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 1.2.8) in the ANSWER BOOK.

1.2.1 The type of egg produced by reptiles that has extra-embryonic membranes

1.2.2 The microscopic gap between two consecutive neurons

1.2.3 The stage of development when secondary sexual characteristics develop in males and females

1.2.4 The release of an ovum from the ovary

1.2.5 The part of the autonomic nervous system that prepares the body for an emergency

1.2.6 The hormone that controls normal growth and development of the skeleton and the muscles

1.2.7 The type of development in birds where the hatchlings' eyes are open and their bodies are covered with down feathers

1.2.8 A plant hormone that stimulates the germination of seeds

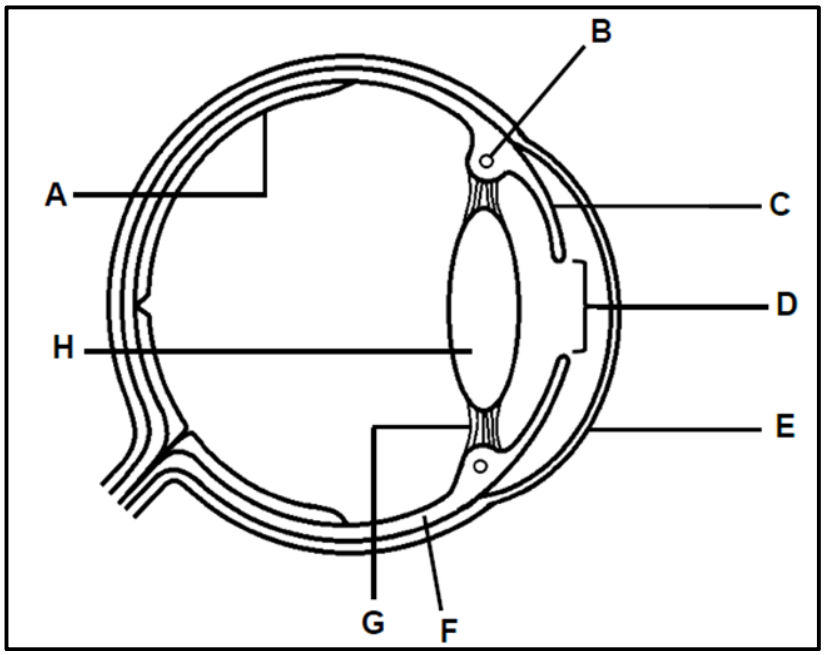
(8 x 1) **(8)**

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 numbers (1.3.1 to 1.3.3) in the ANSWER BOOK.

COLUMN I		COLUMN II
1.3.1	A plant's defence mechanism against pathogens	A: Chemicals B: Thorns
1.3.2	Regulation of water in the body	A: Hypothalamus B: Corpus callosum
1.3.3	Gland(s) that secrete(s) its secretions directly into the bloodstream	A: Endocrine B: Exocrine

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

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



1.4.1 Identify part **G**. (1)

1.4.2 Give the function of part **D**. (1)

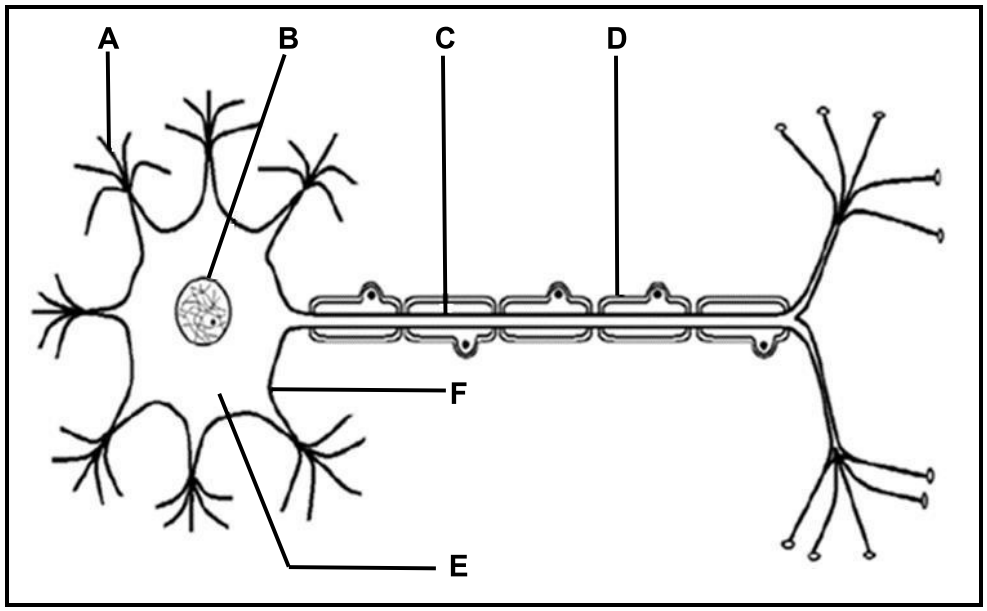
1.4.3 Give the LETTER and the NAME of the structure that:

(a) Supplies food and oxygen to the eye (2)

(b) Contains rods and cones (2)

1.4.4 Name the defect caused when part **H** becomes cloudy and opaque. (1)
(7)

1.5 The diagram below represents the structure of a neuron.



1.5.1 Name the type of neuron in the diagram. (1)

1.5.2 Give TWO visible reasons for your answer to QUESTION 1.5.1. (2)

1.5.3 Identify:

(a) Part **C** (1)

(b) Organelle **B** (1)

1.5.4 Give the LETTER and NAME of the part that transmits impulses to the cell body. (2)

1.5.5 List TWO effectors in the human body. (2)
(9)

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 Read the extract below.

ROMANCE OF THE SEAS: STRANGE MATING HABITS OF THE SEAHORSE

The male and female seahorse come together repeatedly every morning to dance together. They change color as they move together, sometimes with tails entwined.

Seahorses display internal fertilisation. During mating, the female seahorse deposits her pear-shaped egg cells into the male's brood pouch, a specialised structure on his abdomen. Inside this pouch, the male fertilises the egg cells and provides a safe environment for the developing embryos. The walls of the brood pouch have a rich blood supply and provide oxygen and nutrients to the embryos, but the developing young are nourished mainly by their egg yolk.

This mode of reproduction is called ovovivipary, in which embryos develop inside eggs retained within the parent's body until they hatch internally or just before birth. The male then gives birth to tiny, fully independent offspring.

Shortly after the male gives birth, the female already has new egg cells ready, so they can mate again right away. This increases the chances of successful fertilisation and rapid reproduction.

2.1.1 Fertilisation in seahorses takes place internally.

State TWO advantages of internal fertilisation. (2)

2.1.2 Name TWO ways, apart from nutrition, in which the developing embryos benefit from the brood pouch of the male seahorse. (2)

2.1.3 Explain ONE manner in which the chances of survival are increased in seahorses. (2)
(6)

2.2 An investigation was conducted to compare the concentration of glucose in the blood of two people, Mo and Dan, before and after ingesting glucose.

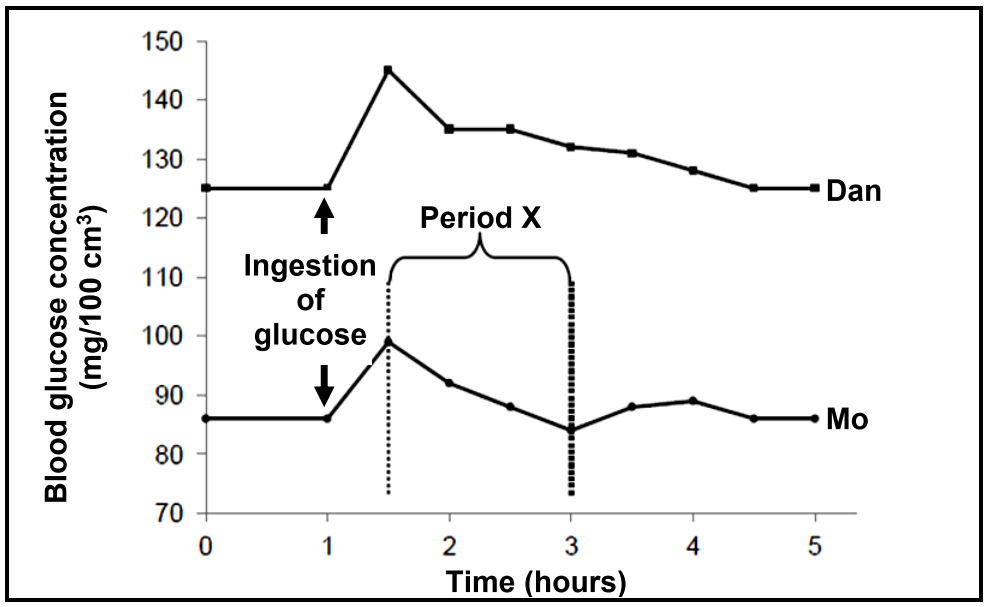
The procedure was as follows:

- The glucose concentration in their blood was measured at the start of the investigation and again ONE 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 FOUR hours after ingesting the glucose solution, the glucose concentration in their blood 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 in blood is between 80 and 120mg/100 cm^3.



2.2.1 State the aim of this investigation. (1)

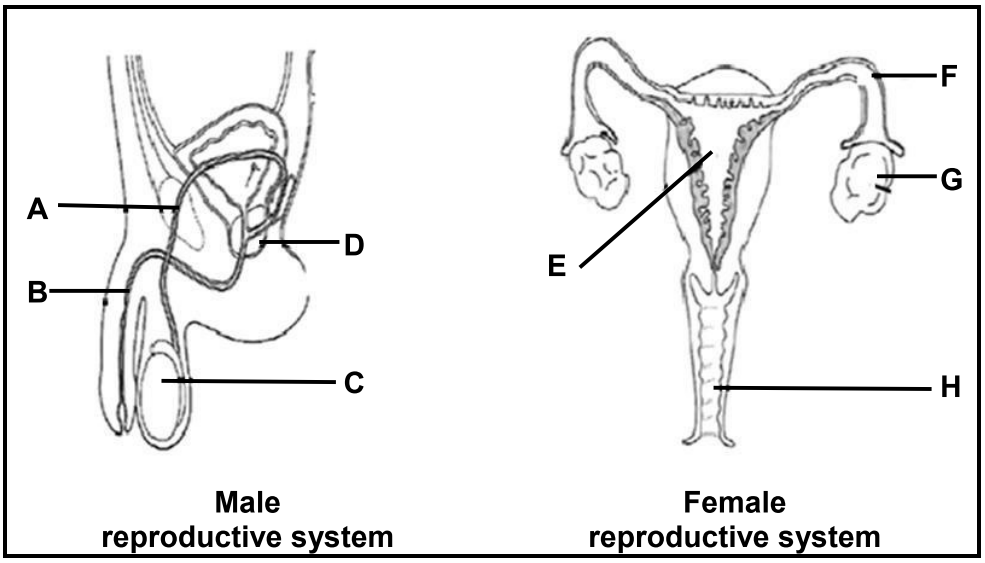
2.2.2 Calculate the increase in Dan's blood glucose level (in mg/100 cm^3) after drinking the glucose solution. Show ALL calculations. (2)

2.2.3 Identify the person (Dan or Mo) who has diabetes mellitus. (1)

2.2.4 Give ONE reason why a person with untreated diabetes mellitus is expected to be tired all the time. (2)

2.2.5 Describe how the changes in Mo's blood glucose levels are regulated during period **X**. (4)
(10)

2.3 The diagram below shows the male and female reproductive systems.



2.3.1 Identify part **H**. (1)

2.3.2 Name the process that takes place in **F**. (1)

2.3.3 Describe how the secretions of gland **D** provide protection for the sperm from the conditions in part **H**. (2)

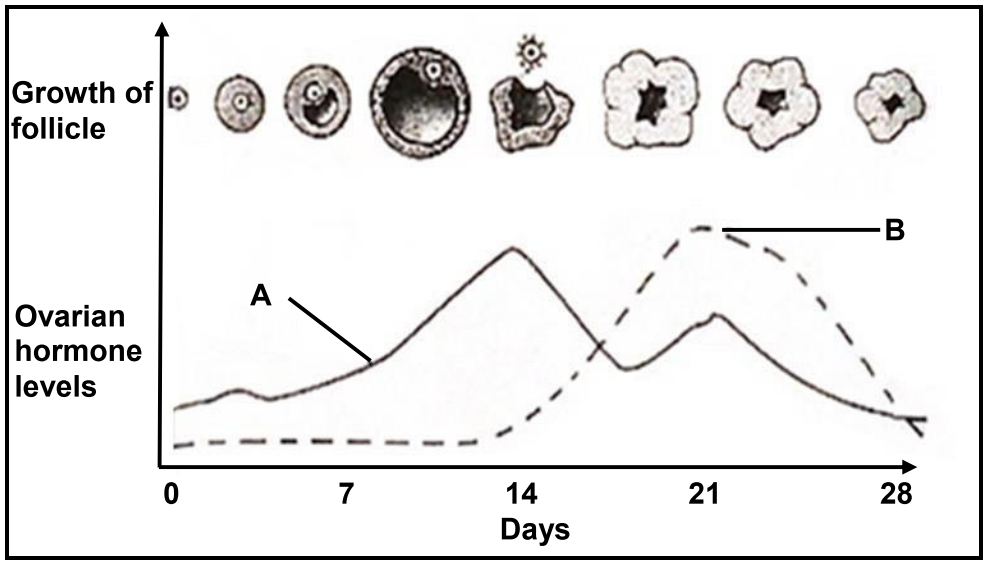
2.3.4 A vasectomy is when part **B** is surgically cut.

Explain why this man will NOT be able to reproduce after this procedure. (3)

2.3.5 Describe the type of gametogenesis that take place at **G**. (5)

2.3.6 Draw a labelled diagram of the gametes found in **C**. (4)
(16)

2.4 The diagram below represents the growth of a follicle and the ovarian hormone levels.



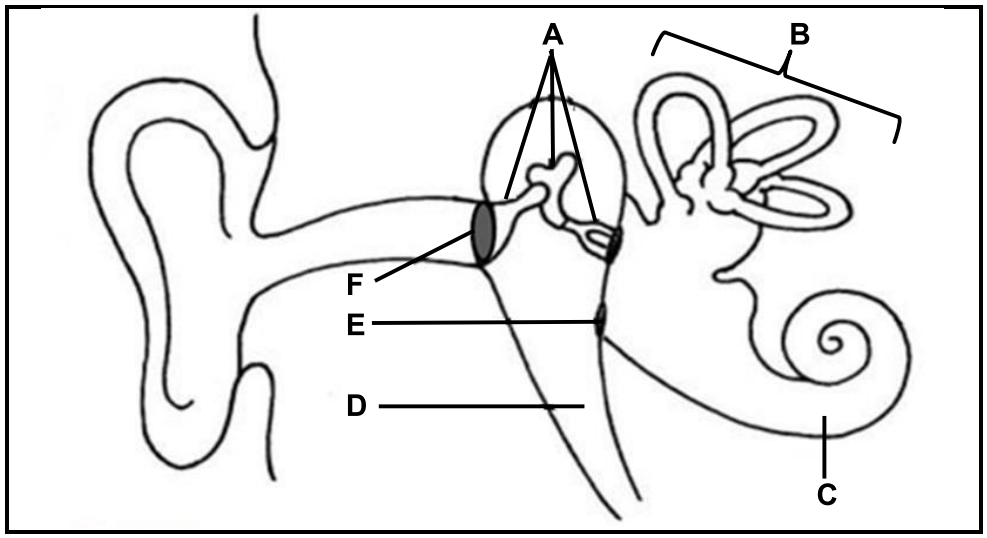
2.4.1 Identify hormone **B**. (1)

2.4.2 Name the follicle responsible for secreting hormone **A**. (1)

2.4.3 Give evidence from the graph that indicates that fertilisation did not take place. (2)

2.4.4 Describe the process that takes place in the uterus after fertilisation did not occur. (4)
(8)

2.5 The diagram below represents the human ear.



2.5.1 Name the part of the brain that receives impulses from:

(a) Part **B** (1)

(b) Part **C** (1)

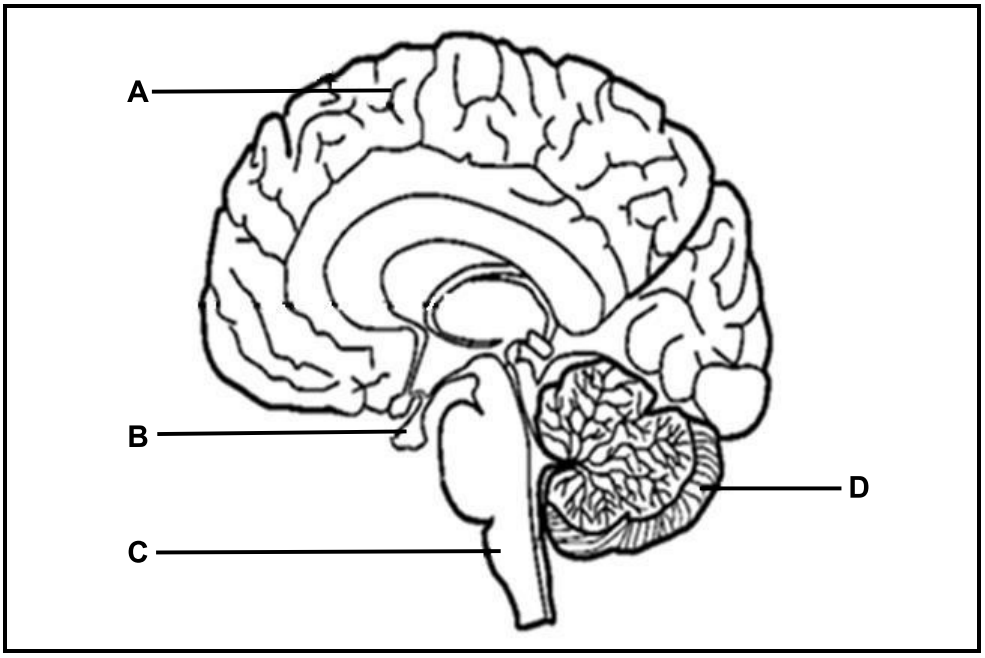
2.5.2 Explain how the fusion of the structures at **A** may lead to hearing loss. (5)

2.5.3 Describe how an increased production of mucus in the nose and throat may lead to the bursting of part **F.** (3)

(10)
[50]

QUESTION 3

3.1 The diagram below shows the human brain.



3.1.1 Identify part **D**. (1)

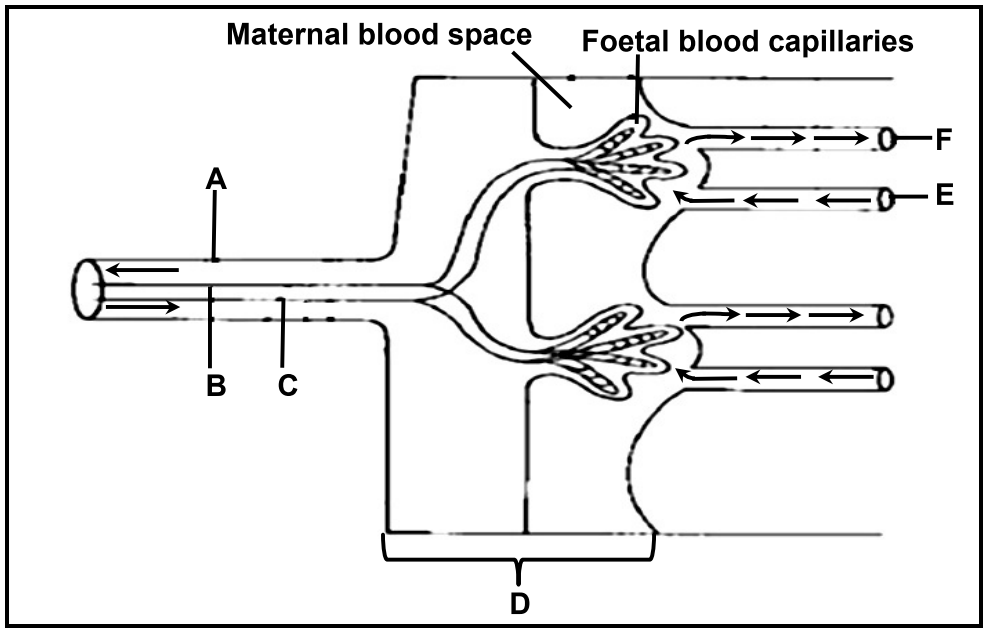
3.1.2 Give the LETTER and NAME of the part of the brain that has the centre for interpreting taste. (2)

3.1.3 Name ONE way how the brain is protected. (1)

3.1.4 Explain how the body would be affected if part **B** did not secrete TSH. (3)

3.1.5 Describe how part **C** restores the carbon dioxide concentration in the blood when it rises above normal levels. (5)
(12)

3.2 The diagram below shows the circulation of blood in the endometrium of a pregnant woman. The arrows indicate the direction of the flow of blood.



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

3.2.2 Name the process that enables the exchange of substances between the maternal blood space and the foetal blood capillaries. (1)

3.2.3 Name ONE hormone that prepares part **D** for implantation. (1)

3.2.4 Explain ONE negative consequence on foetal development if part **D** is reduced significantly. (2)

3.2.5 Tabulate TWO differences in the composition of blood flowing to and from the foetus in blood vessels **B** and **C**. (5)
(10)

3.3 Describe how the human skin maintains the body temperature when the environmental temperature is 40 ºC. **(5)**

3.4 A person sitting in a darkened room covers one eye. A dim electric bulb, positioned at varying distances from the person, is switched on for a period of 9 seconds at one-minute intervals. During this period, the diameter of the pupil of the eye is measured every second.

The results obtained are shown in the table below.

Time interval (seconds)	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Diameter of pupil (mm)	2	4	5	5	8	7	3	1	6

3.4.1 Identify the TWO consecutive intervals when the pupil's diameter decreased the most. (2)

3.4.2 Describe how the size of the pupil changes from interval **8** to interval **9**. (4)

3.4.3 Describe why the answer to QUESTION 3.4.2 is a reflex action. (2)

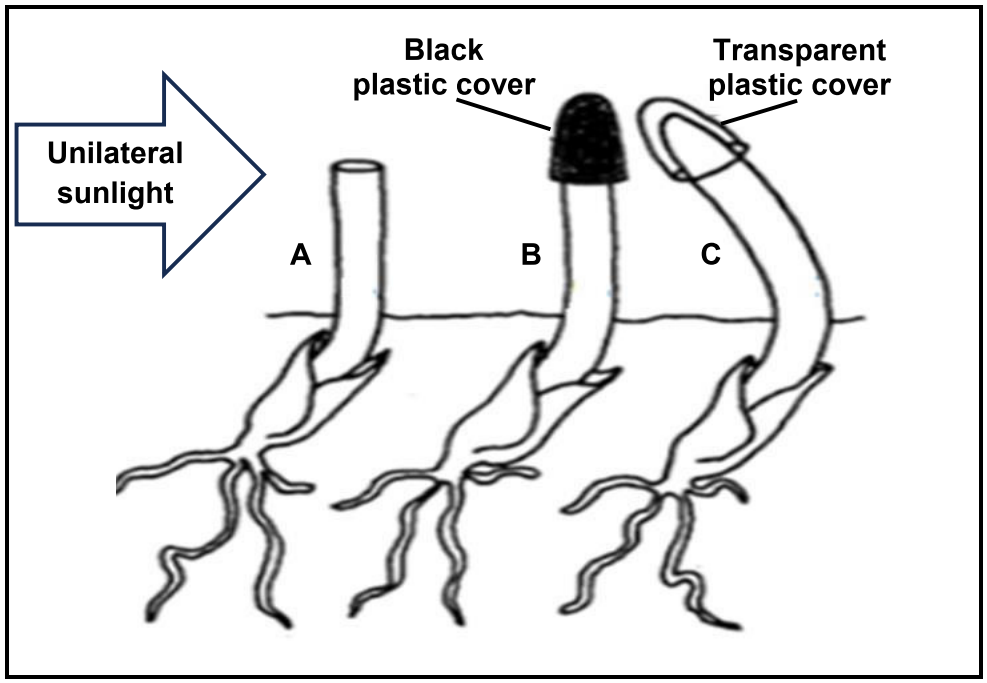
3.4.4 State ONE way in which the investigator could ensure that the results of the investigation are reliable. (1)

3.4.5 Draw a line graph to represent the data shown in the table (6)
(15)

3.5 The diagram below shows the results of an investigation carried out to determine the effect of a plant hormone on the growth of coleoptiles (young shoots).

The procedure was as follows:

- Three coleoptiles were used.
- Coleoptile **A** had its apical bud removed.
- Coleoptile **B** had its apical bud covered with a black plastic cover.
- Coleoptile **C** had its apical bud covered with a transparent plastic cover.
- All three coleoptiles (**A**, **B** and **C**) were then exposed to unilateral sunlight.



3.5.1 Name the type of tropism that is observed. (1)

3.5.2 Name the plant hormone responsible for the type of tropism mentioned in QUESTION 3.5.1. (1)

3.5.3 Explain the results obtained in coleoptile **C**. (4)

3.5.4 Explain why lateral branches will develop in coleoptile **A**. (2)
(8)
[50]

TOTAL SECTION B: 100
GRAND TOTAL: 150