Northern Cape Department of Education

PROVINSIALE VOORBEREIDENDE EKSAMEN/
PROVINCIAL PREPARATORY EXAMINATION

GRAAD/GRADE 12

LEWENSWETENSKAPPE/LIFE SCIENCES

VRAESTEL/PAPER 1

SEPTEMBER 2026

PUNTE/MARKS: 150

TYD/TIME: 2½ uur/hours

Hierdie vraestel bestaan uit 17 bladsye./
This question paper consists of 17 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 must use a non-programmable calculator, protractor and a compass, where necessary.
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 numbers (1.1.1 to 1.1.10) in the ANSWER BOOK, e.g. 1.1.11 D.

1.1.1 The layer of the eye that contains photoreceptors is the …

A sclera.
B choroid.
C retina.
D lens.

1.1.2 A function of gibberellins is …

A the germination of seeds.
B that it causes seed dormancy.
C to control the growing of roots into the soil.
D that it helps the plant to survive in cold conditions.

1.1.3 Which ONE of the following is CORRECT regarding the control of metabolism in the human body?

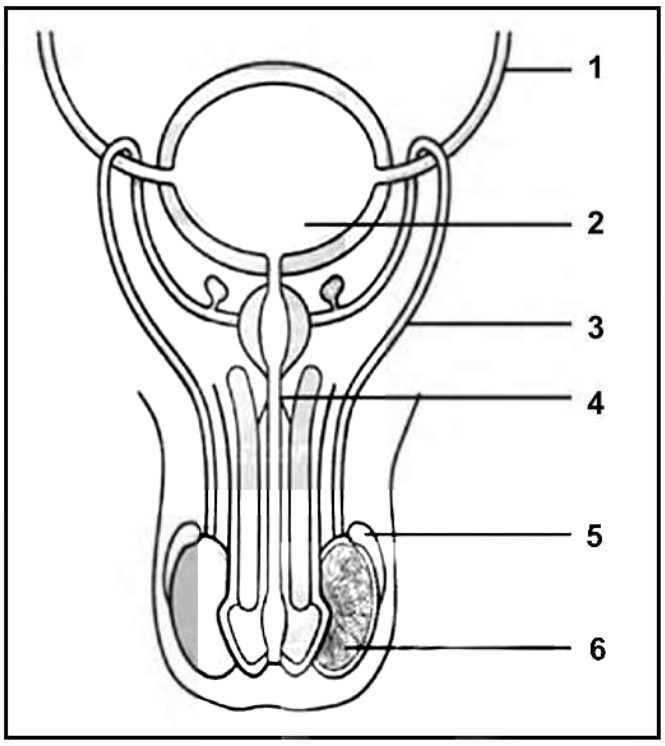
	METABOLISM	GLAND STIMULATED	HORMONE SECRETED
A	High metabolism	Thyroid gland	More thyroxin
B	High metabolism	Pituitary gland	More TSH
C	Low metabolism	Pituitary gland	More TSH
D	Low metabolism	Thyroid gland	Less thyroxin

1.1.4 The acrosome inside a sperm cell …

A produces energy through cellular respiration.
B contains genetic material.
C controls the movement of the tail.
D contains enzymes needed to break down the outer layers of the ovum.

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1.1.5 The diagram below represents the human male reproductive system.



Which part(s) store(s) sperm until maturation?

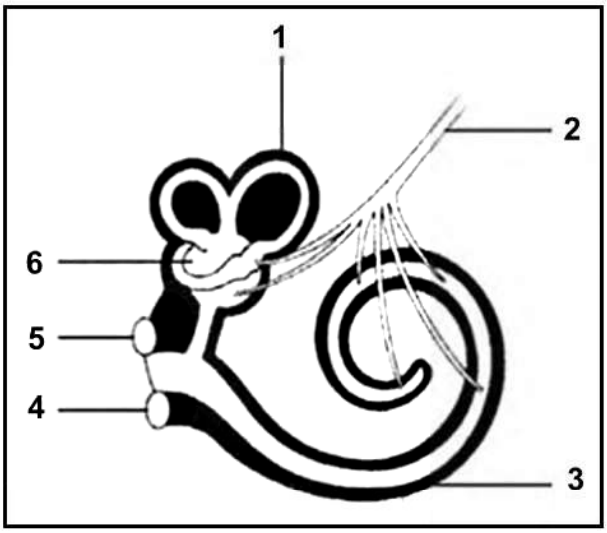
A 5 only
B 2, 5 and 6
C 1, 3 and 4
D 6 only

1.1.6 A gardener regularly removes the apical buds from a rose bush. As a result, the rose bush will …

A produce more roses.
B grow taller.
C remain the same size.
D produce fewer roses.

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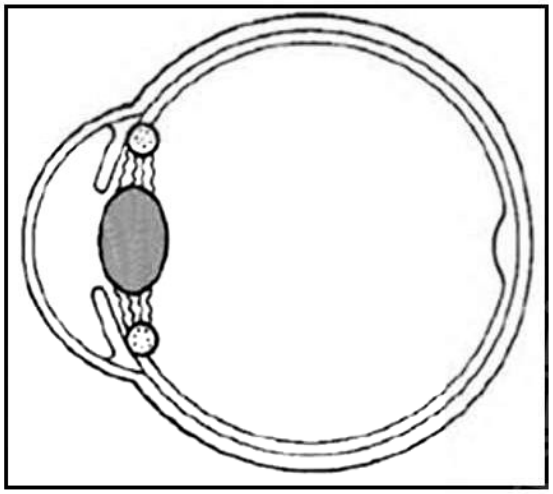
1.1.7 The diagram below represents a human ear.



Which ONE of the following combinations represents the parts of the ear involved in maintaining balance?

A 1, 4 and 6
B 1, 3, 4 and 5
C 1, 2, 3 and 5
D 1, 2 and 6

1.1.8 The diagram below represents a cross section of a human eye.



The functional response illustrated in the diagram is …

A accommodation for near vision.
B accommodation for far vision.
C pupillary mechanism for dim light.
D pupillary mechanism for bright light.

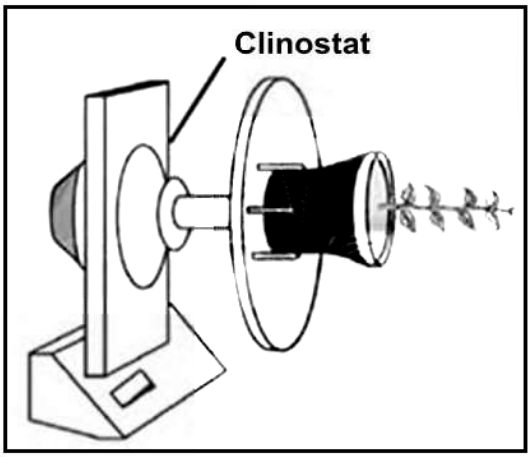
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1.1.9 Which ONE of the following is only an exocrine gland?

A Hypothalamus
B Cowper's gland
C Pancreas
D Pituitary gland

1.1.10 An investigation was done in which a potted plant was placed horizontally on a clinostat, as shown in the diagram. The plant was exposed to uniform light from all directions.

(A clinostat is a device with a rotating disc that, when switched on, allows the attached plant to also rotate.)



The stem kept growing straight, which indicates that the clinostat was …

A stationary and the stem showed negative geotropism.
B rotating and the stem showed negative geotropism.
C rotating, therefore cancelling out the effect of gravity.
D stationary, therefore cancelling out the effect of gravity.

(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 The hollow balls of cells that forms during embryonic development

1.2.2 A plant response to an external stimulus

1.2.3 A fluid that protects the human embryo against injuries and large-scale temperature changes

1.2.4 The widening of blood capillaries in the skin

1.2.5 The inhibition of the growth of lateral branches due to the downwards movement of a plant growth hormone

1.2.6 The lower, narrow part of the uterus

1.2.7 The control centre for temperature regulation in the brain

1.2.8 The plant hormone that causes leaves to fall off trees in autumn

1.2.9 The part of the nervous system that is made up of cranial and spinal nerves

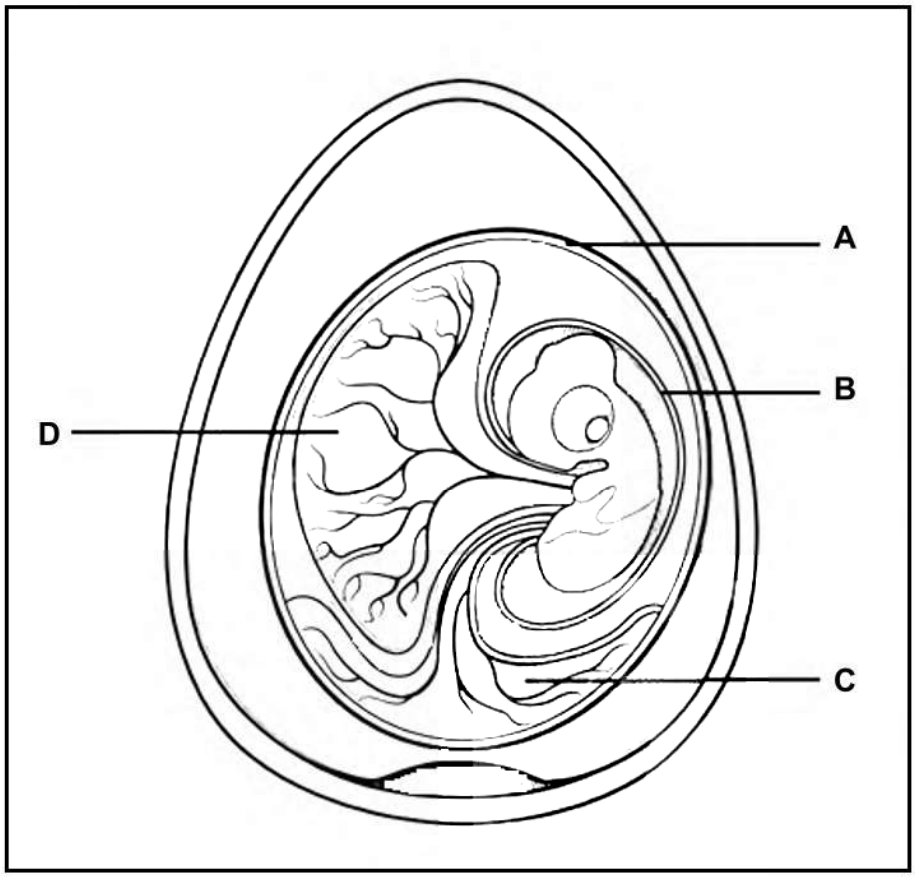
(9 x 1) **(9)**

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 numbers (1.3.1 to 1.3.3) in the ANSWER BOOK.

COLUMN I		COLUMN II
1.3.1	Forms the placenta	A: Chorionic villi B: Endometrium
1.3.2	The blood vessel that transports oxygenated blood from the placenta to the foetus	A: Umbilical vein B: Umbilical artery
1.3.3	The hormone that is in excess in an abnormally tall person	A: Adrenalin B: Growth hormone

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

1.4 The diagram below shows the structure of an amniotic egg.



1.4.1 Give the LETTER and NAME of the part that:

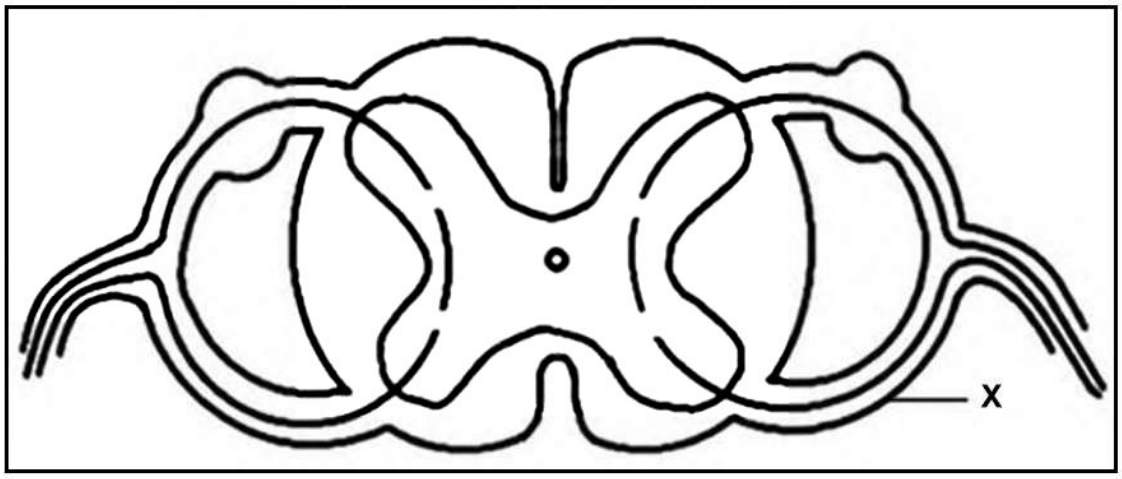
(a) Contains food reserves for the developing embryo (2)

(b) Collects nitrogenous waste (2)

(c) Allows for gaseous exchange in reptiles and birds (2)

(d) Prevents dehydration of the developing embryo (2)
(8)

1.5 The diagram below shows a part of the human central nervous system.



1.5.1 Identify the part of the central nervous system shown in the diagram. (1)

1.5.2 Identify part **X**. (1)

1.5.3 Give the name of ONE structure that protects the part of the central nervous system named in QUESTION 1.5.1. (1)

1.5.4 Give the NAMES of the neurons of the reflex arc, visible in the diagram, in the correct sequence from a receptor to an effector. (4)
(7)
[50]

TOTAL SECTION A: 50

SECTION B

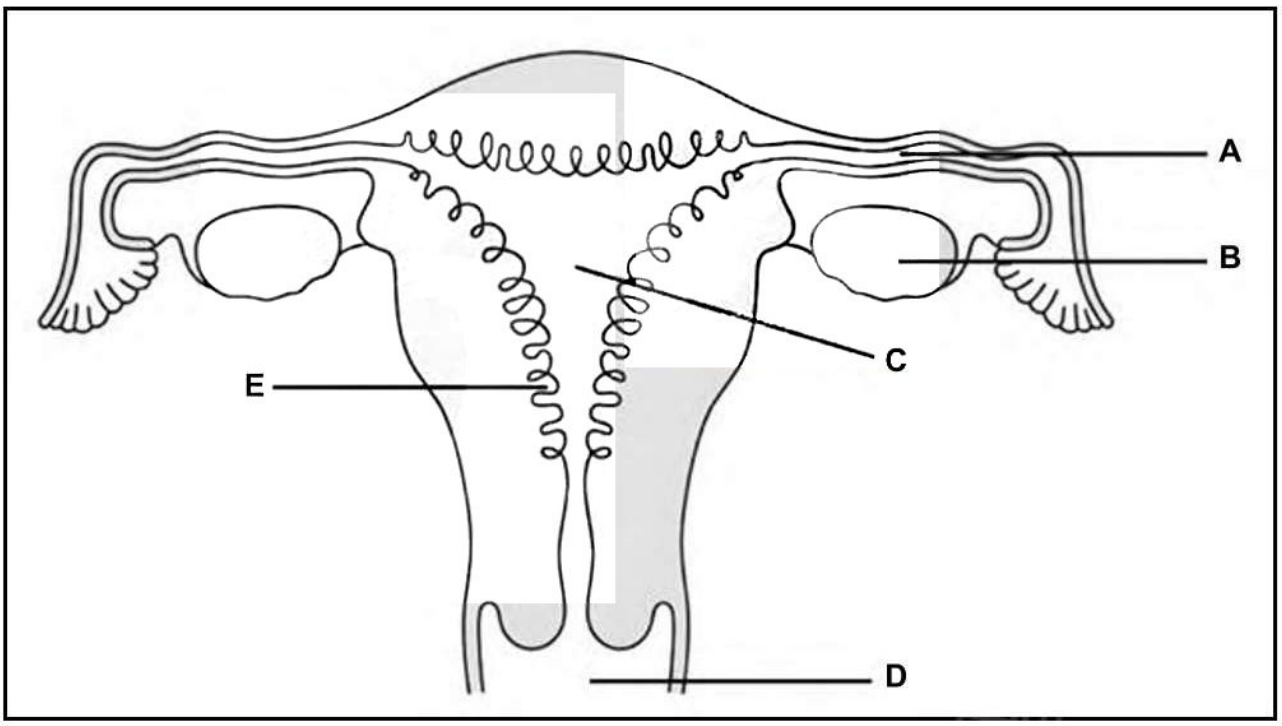
QUESTION 2

2.1 Plants can respond to changes in their environment.

Draw a diagram to illustrate the growth of a plant stem if it is exposed to unilateral light.

Your diagram should include all relevant labels and also the NAME of the plant hormone responsible for this reaction. Also show where the highest concentration of this hormone will be found. **(4)**

2.2 The diagram below shows the structure of the female reproductive system.



2.2.1 Identify part:

(a) **C** (1)

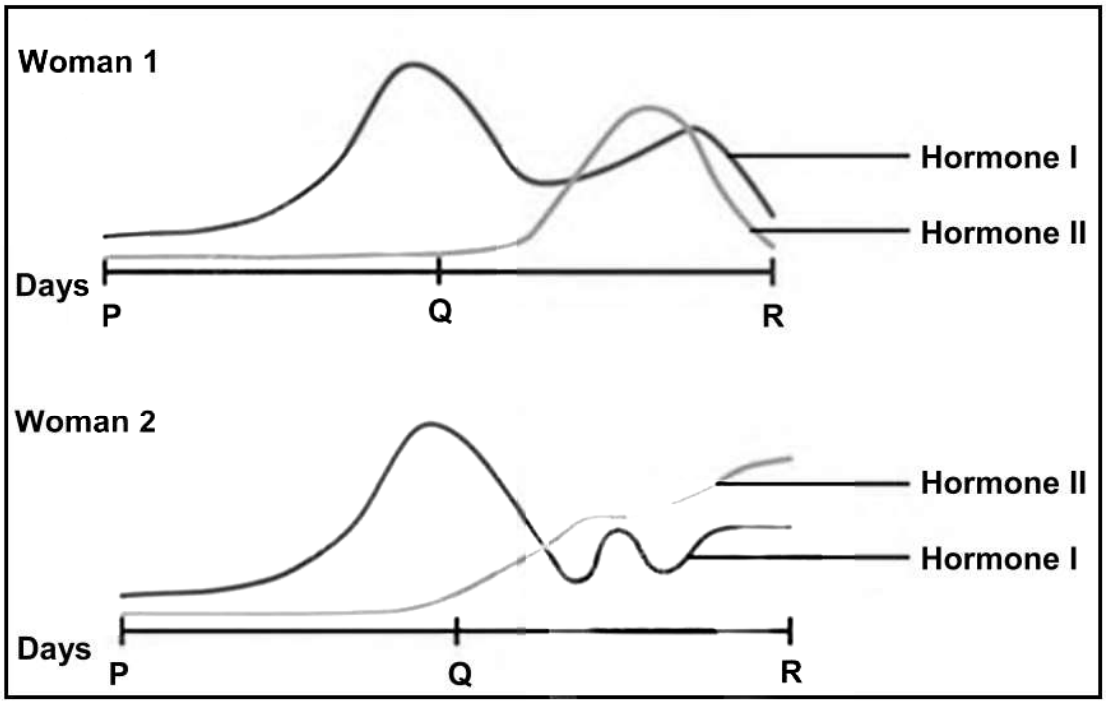
(b) **D** (1)

2.2.2 Give the LETTER and NAME of the part where:

(a) Fertilisation occurs (2)

(b) Implantation occurs (2)

The following graphs illustrate the hormones secreted by part **B** in two women. The LETTERS **P**, **Q** and **R** represent different days in their menstrual cycles.



2.2.3 Referring to the graphs above:

(a) Identify hormone **I** (1)

(b) Identify hormone **II** (1)

(c) Describe the process in the uterine cycle that occurs between day **P** and day **Q** of a woman who is not pregnant. (2)

(d) Identify the woman (**1** or **2**) who is pregnant. (1)

(e) Give a reason for your answer to QUESTION 2.2.3 (d). (2)

2.2.4 A prolactinoma is a non-cancerous pituitary tumour that produces excess levels of prolactin. In women, excess levels of prolactin can lower the levels of the hormones related to the ovarian cycle.

(a) Name the reproductive hormones, secreted by the pituitary, that will be affected by excess levels of prolactin. (2)

(b) Describe the effect that a prolactinoma will have on the function of each of the hormones named in QUESTION 2.2.4 (a). (4)
(19)

2.3 The levels of testosterone secreted by men change with their age.

The table below shows the average levels of testosterone secreted by men of different age groups.

AGE GROUP (Years)	AVERAGE TESTOSTERONE LEVEL (ng/dL)
18 – 25	675
26 – 35	600
36 – 55	525
56+	450

2.3.1 Identify the gland in the male body that secretes testosterone. (1)

2.3.2 Name TWO functions of testosterone in the male body. (2)

2.3.3 Draw a bar graph to show the results in the table. (6)

2.3.4 Give a conclusion regarding the data provided in the table. (2)
(11)

2.4 Read the extract below.

COMPLICATION OF DIABETES MELLITUS

Diabetic ketoacidosis (DKA) is a life-threatening complication of diabetes where a lack of insulin influences homeostasis. The body then breaks down fat too quickly for energy, producing a dangerous acidic buildup (ketones). It mainly affects type 1 diabetics, leading to high blood sugar, extreme thirst, rapid and deep breathing, frequent urination, nausea, and, if untreated, coma or death.

2.4.1 Define *homeostasis*. (2)

2.4.2 Give the name of the organ that secretes insulin. (1)

2.4.3 Give TWO symptoms of diabetic ketoacidosis (DKA). (2)

2.4.4 Explain what causes the rapid, deep breathing mentioned in the extract. (3)

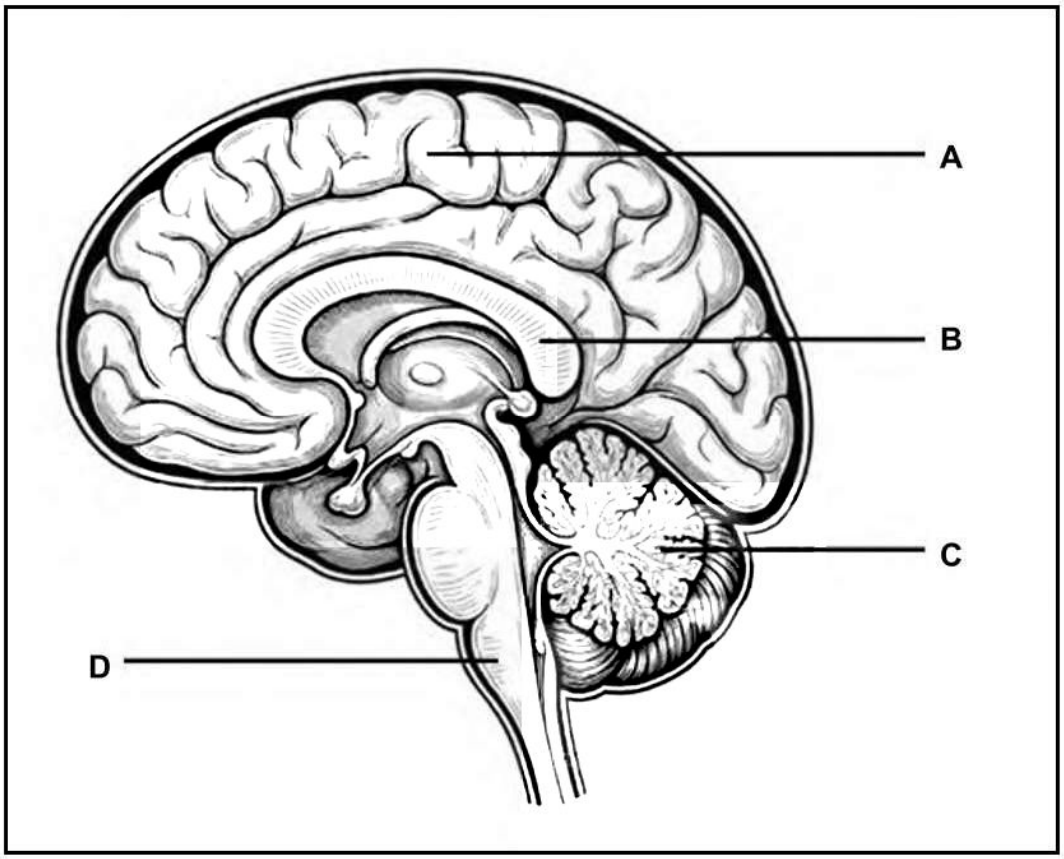
2.4.5 Describe how high blood glucose levels are normally controlled in people without diabetes. (3)

2.4.6 Explain why frequent urination is a symptom of DKA. (5)
(16)
[50]

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QUESTION 3

3.1 The diagram below shows a part of the human central nervous system.



3.1.1 Identify part:

(a) **A** (1)

(b) **D** (1)

3.1.2 Explain ONE function of part:

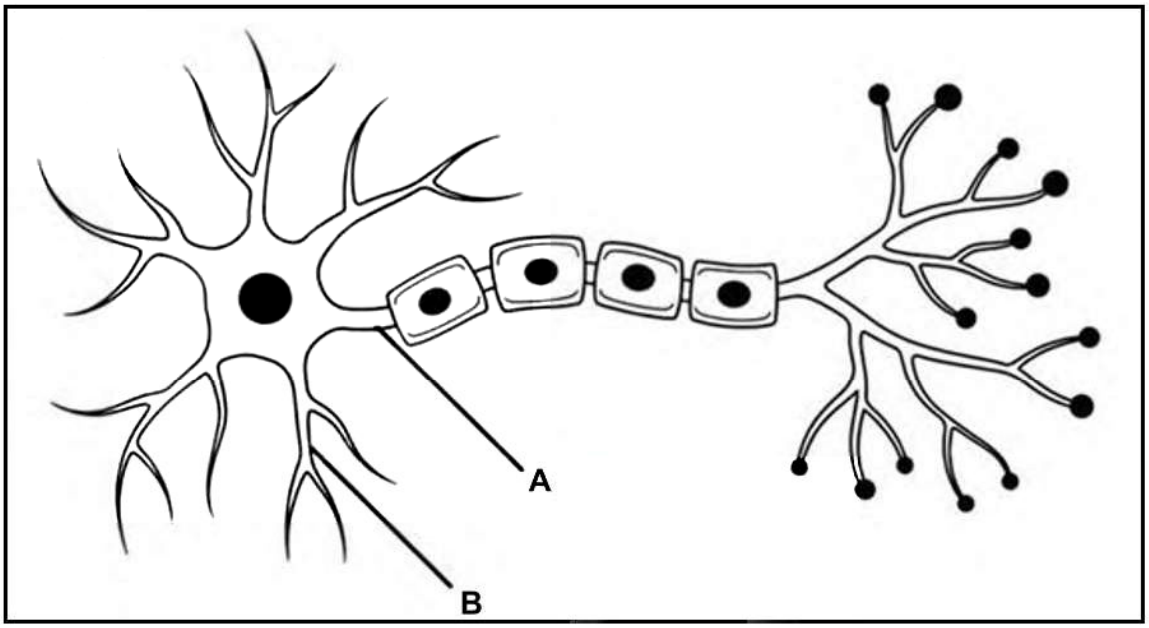
(a) **B** (2)

(b) **C** (2)

3.1.3 Name the irreversible brain disease that involves progressive brain cell death, resulting in memory loss. (1)
(7)

3.2 Tabulate TWO differences between the sympathetic and parasympathetic sections of the autonomic nervous system. **(5)**

3.3 The diagram below represents a type of neuron found in the human body.



3.3.1 Identify the neuron in the diagram. (1)

3.3.2 Give the LETTER and NAME of the part that transmits impulses:

(a) Towards the cell body (2)

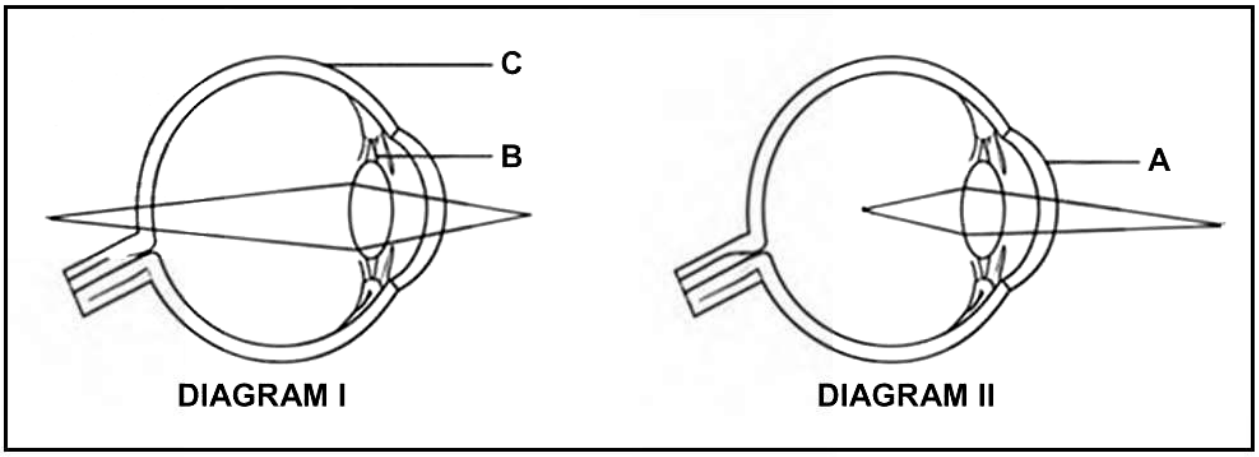
(b) Away from the cell body (2)

3.3.3 Explain ONE way in which the neuron mentioned in QUESTION 3.3.1 is structurally adapted to conduct impulses rapidly. (2)

3.3.4 Give the name of the connection between two neurons. (1)

3.3.5 Provide TWO significances of the connection mentioned in QUESTION 3.3.4. (2)
(10)

3.4 The diagrams below represent the structure of an eye that causes short-sightedness and an eye that causes long-sightedness. The diagrams are NOT drawn in any particular order.



3.4.1 Identify part:

(a) **A** (1)

(b) **B** (1)

(c) **C** (1)

3.4.2 Identify the diagram (**I** or **II**) that represents long-sightedness. (1)

3.4.3 Name the type of lens that would be prescribed for a person suffering from short-sightedness. (1)

3.4.4 Describe THREE differences between long-sightedness and short-sightedness. (6)
(11)

3.5 Describe how HEARING takes place in humans. **(7)**

3.6 Cushing's syndrome is a metabolic disorder caused by prolonged exposure to high levels of cortisol, a hormone produced by the adrenal glands. Cortisol is often called the 'stress hormone' because it increases the concentration of glucose in the bloodstream to provide energy. In Cushing's syndrome, the normal negative feedback mechanism that regulates cortisol fails, leading to chronically high blood sugar.

Scientists investigated the effect of abnormally high cortisol levels (Cushing's syndrome) on the resting blood glucose concentration of individuals.

The procedure was as follows:

- Two groups of five participants each were selected
- Group **A** comprises healthy individuals with normal adrenal function
- Group **B** comprises individuals diagnosed with Cushing's syndrome
- It was ensured that all participants fasted for 8 hours prior to the investigation
- A glucometer was used to measure and record the resting blood glucose levels of each participant
- The results were recorded
- The average blood glucose for each group was calculated

The results indicated that Group **A** had normal cortisol and glucose levels while Group **B** had high cortisol and glucose levels.

3.6.1 Where in the human body can the adrenal glands be found? (1)

3.6.2 Name TWO other hormones secreted by the adrenal glands. (2)

3.6.3 State the dependent variable for this investigation. (1)

3.6.4 Give a reason why Group **A** was used in the investigation. (1)

3.6.5 List TWO variables that were kept constant to ensure the validity of the investigation. (2)

3.6.6 State ONE factor that contributed to the reliability of the investigation. (1)

3.6.7 Suggest TWO ways in which the reliability of the investigation could have been improved. (2)

(10)
[50]

TOTAL SECTION B: 100
GRAND TOTAL: 150

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