



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.**

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.

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?

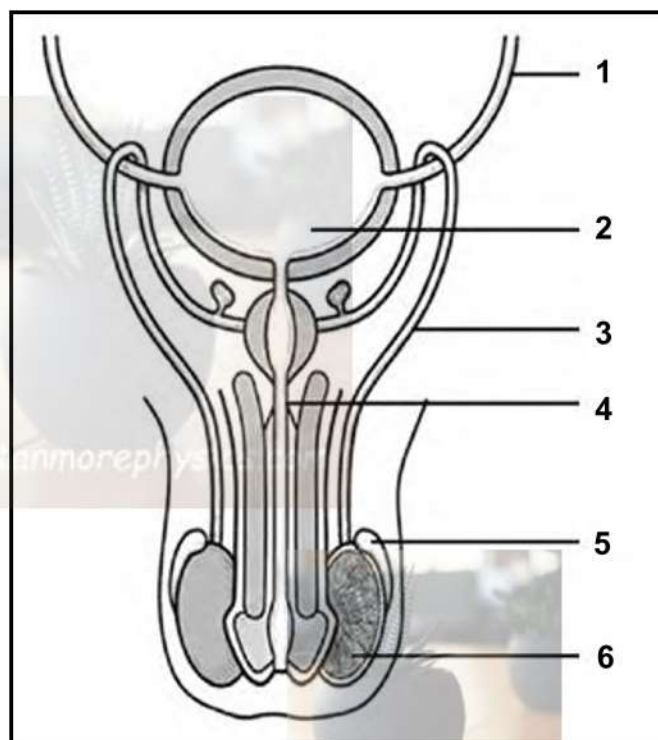
	METABOLISM	GLAND STIMULATED	HORMONE SECRETED
A	High metabolism	Thyroid gland	More thyroxin
B	High metabolism	Pituitary gland	More TSH
C	Low metabolism	Pituitary gland	More TSH
D	Low metabolism	Thyroid gland	Less thyroxin

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.



The diagram below represents the human male reproductive system.



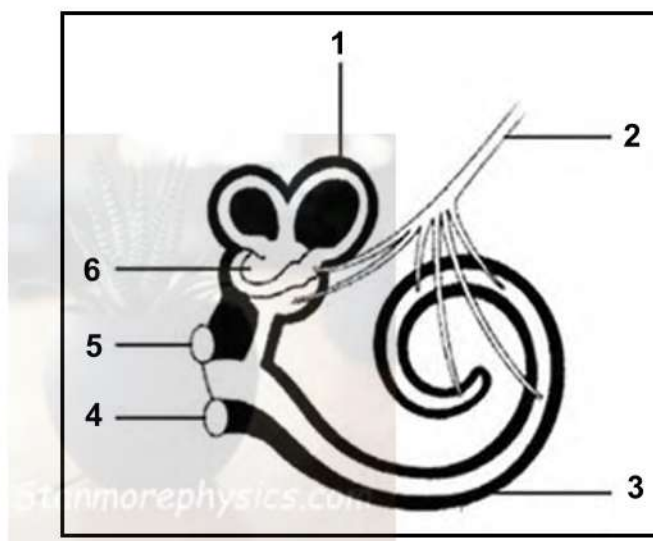
Which part(s) store(s) sperm until maturation?

- 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.

1.1.7 The diagram below represents a human ear.

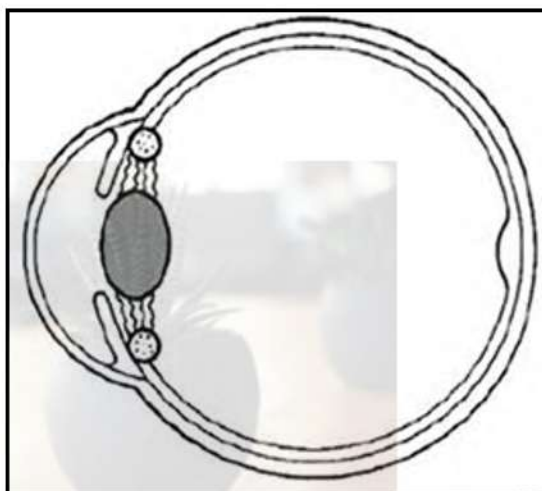


Which ONE of the following combinations represents the parts of the ear involved in maintaining balance?

- 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 ...

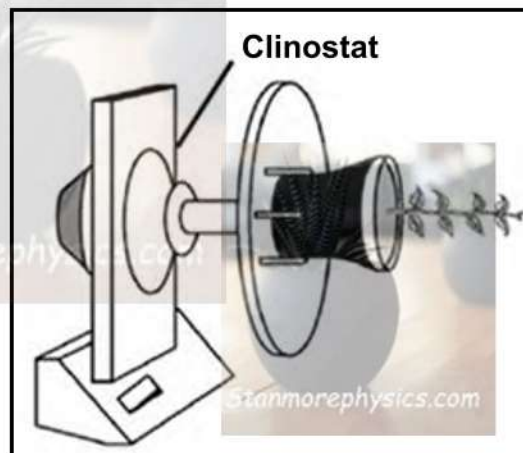
- A accommodation for near vision.
- B accommodation for far vision.
- C pupillary mechanism for dim light.
- D pupillary mechanism for bright light.

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

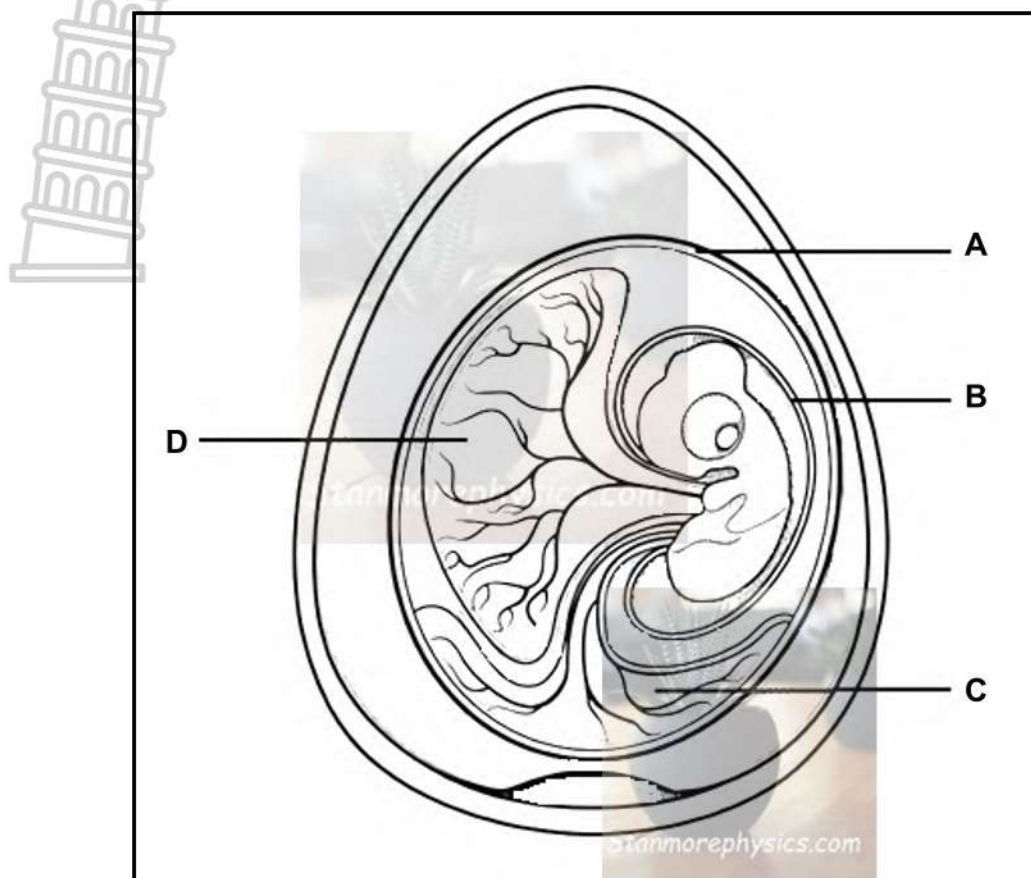
(9 x 1) **(9)**

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)**

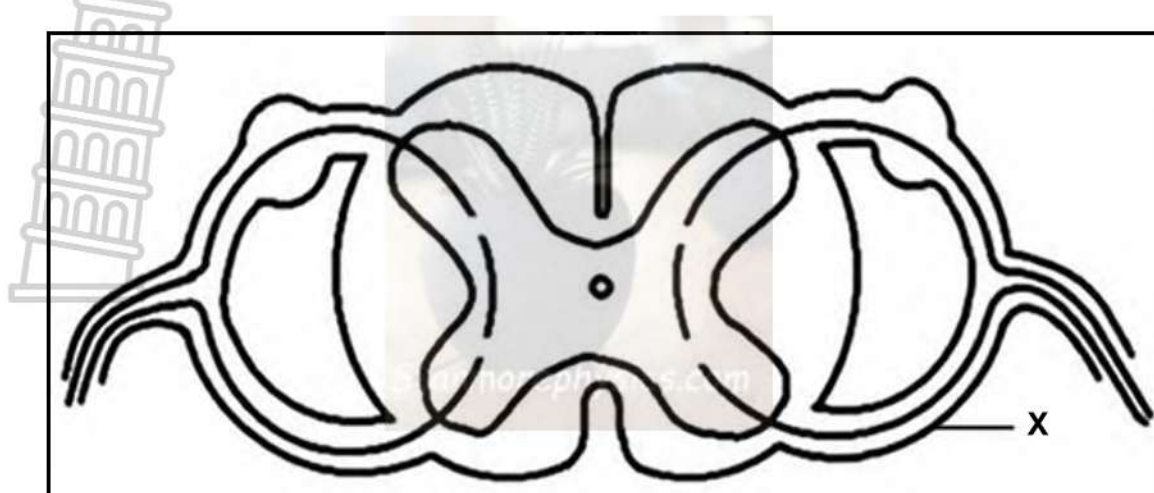
1.4 The diagram below shows the structure of an amniotic egg.



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

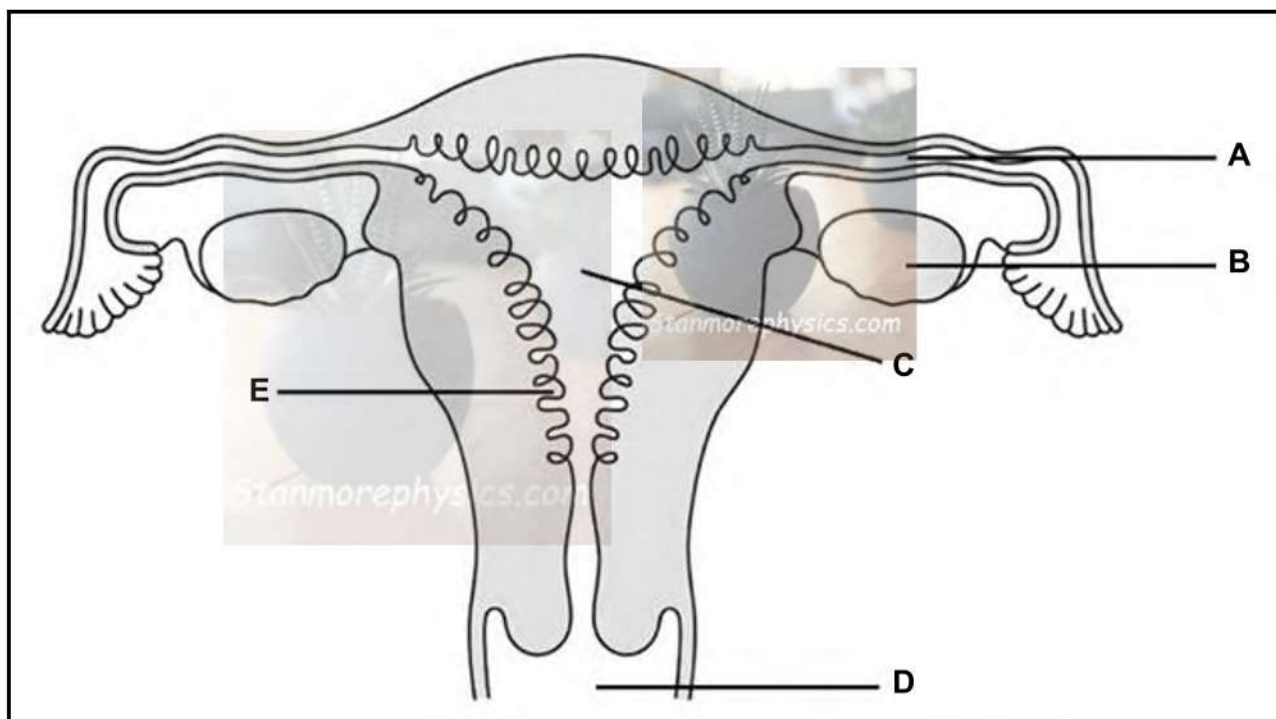
2.1 Plants can respond to changes in their environment.

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)

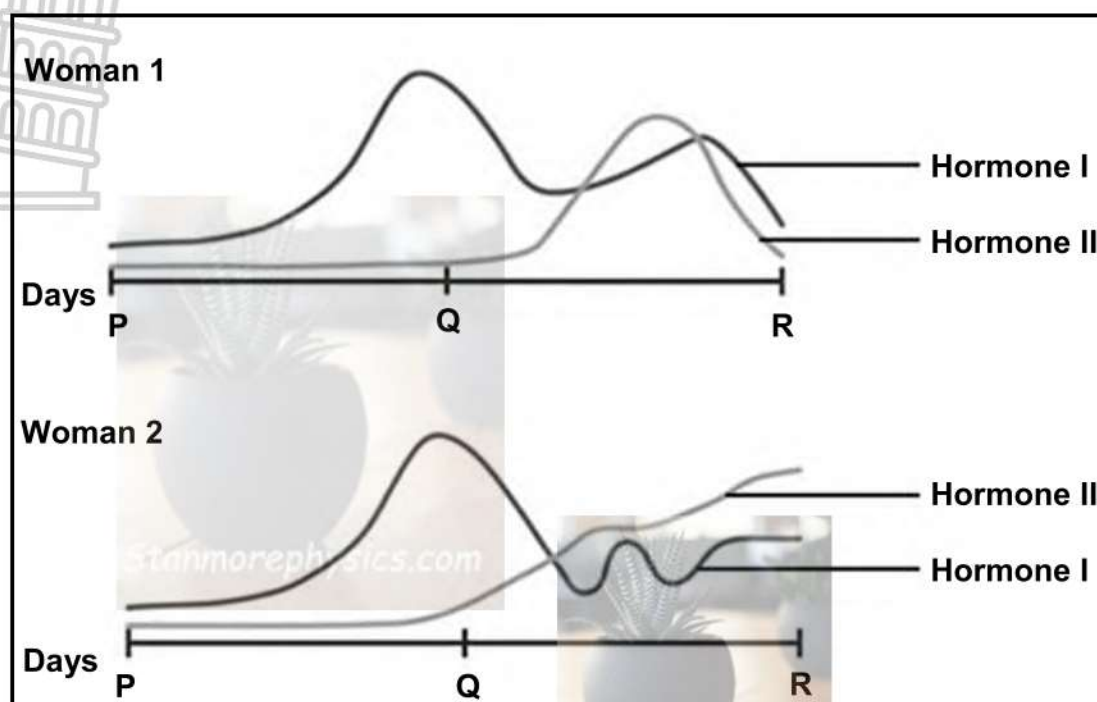
(b) **D** (1)

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:

- Identify hormone I (1)
- Identify hormone II (1)
- Describe the process in the uterine cycle that occurs between day **P** and day **Q** of a woman who is not pregnant. (2)
- Identify the woman (**1** or **2**) who is pregnant. (1)
- 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.

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

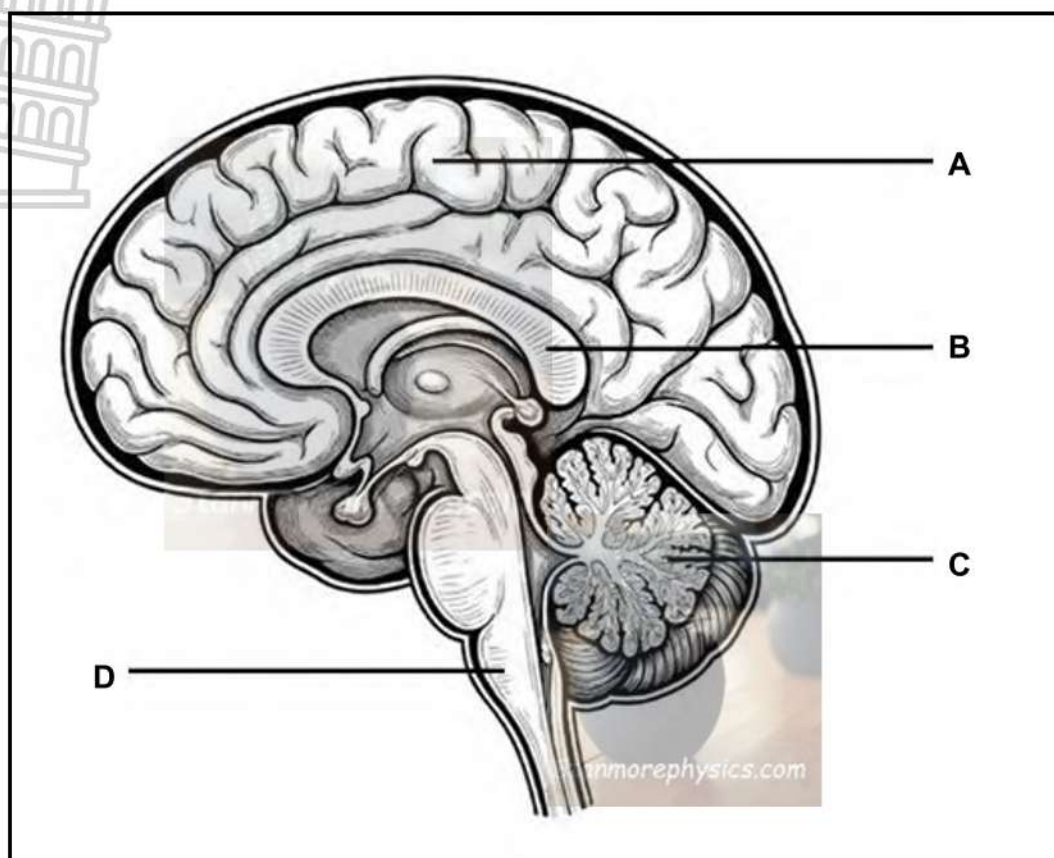
COMPLICATION OF DIABETES MELLITUS

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 <i>homeostasis</i> . | (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] |

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)

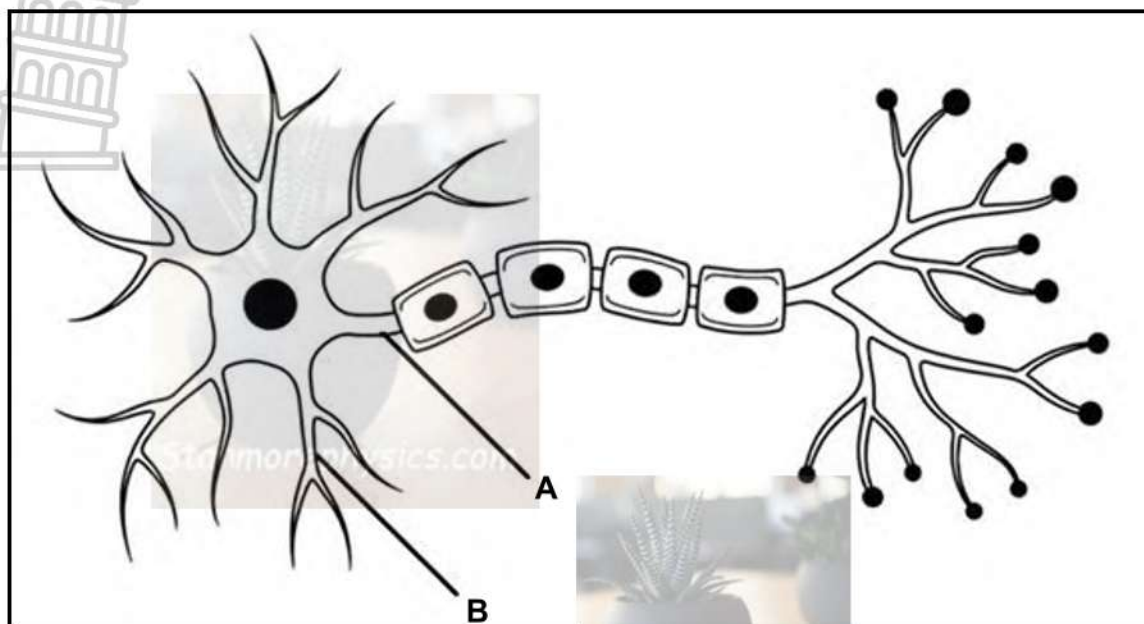
3.1.3 Name the irreversible brain disease that involves progressive brain cell death, resulting in memory loss.

(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)

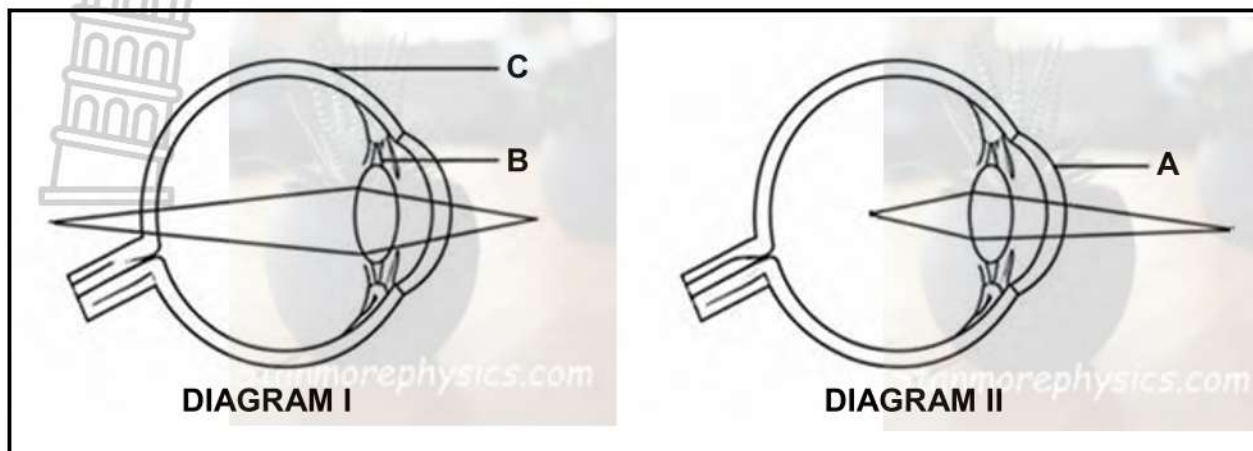
(b) Away from the cell body (2)

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



Northern Cape Department of Education

PROVINCIAL PREPARATORY EXAMINATION

GRADE 12

**LIFE SCIENCES
PAPER 1
SEPTEMBER 2026
MARKING GUIDELINES**

MARKS: 150

These marking guidelines consist of 12 pages.

PRINCIPLES RELATED TO MARKING LIFE SCIENCES

1. **If more information than marks allocated is given**
Stop marking when the maximum mark is reached and put a wavy line and 'max' in the right-hand margin.
2. **If, for example, three reasons are required, and five are given**
Mark the first three irrespective of whether all or some are correct/incorrect.
3. **If the whole process is given when only a part of it is required**
Read all and credit the relevant part.
4. **If comparisons are asked for, but descriptions are given**
Accept if the differences/similarities are clear.
5. **If tabulation is required, but paragraphs are given**
Candidates will lose marks for not tabulating.
6. **If diagrams are given with annotations when descriptions are required**
Candidates will lose marks.
7. **If flow charts are given instead of descriptions**
Candidates will lose marks.
8. **If sequence is muddled and links do not make sense**
Where sequence and links are correct, credit. Where sequence and links are incorrect, do not credit. If sequence and links become correct again, resume credit.
9. **Non-recognised abbreviations**
Accept if first defined in answer. If not defined, do not credit the unrecognised abbreviation, but credit the rest of the answer if correct.
10. **Wrong numbering**
If the answer fits into the correct sequence of questions, but the wrong number is given, it is acceptable.
11. **If language used changes the intended meaning**
Do not accept.
12. **Spelling errors**
If recognisable, accept the answer, provided it does not mean something else in Life Sciences or if it is out of context.

13. **If common names are given in terminology**
Accept, provided it was accepted at the national memo discussion meeting.
14. **If only the letter is asked for, but only the name is given (and vice versa)**
Do not credit.
15. **If units are not given in measurements**
Candidates will lose marks. The memorandum will allocate marks for units separately.
16. **Be sensitive to the sense of an answer, which may be stated differently.**
17. **Caption**
All illustrations (diagrams, graphs, tables, etc.) must have a caption.
18. **Code-switching of official languages (terms and concepts)**
A single word or two that appear(s) in any official language other than the learner's assessment language used to the greatest extent in his/her answers should be credited, if it is correct. A marker that is proficient in the relevant official language should be consulted. This applies to all official languages.
19. **Changes to the memorandum**
No changes must be made to the memoranda without the approval of the examiner and moderator.

SECTION A

QUESTION 1

- 1.1
- | | | |
|--------|-----|---------------|
| 1.1.1 | C✓✓ | |
| 1.1.2 | A✓✓ | |
| 1.1.3 | C✓✓ | |
| 1.1.4 | D✓✓ | |
| 1.1.5 | A✓✓ | |
| 1.1.6 | A✓✓ | |
| 1.1.7 | D✓✓ | |
| 1.1.8 | A✓✓ | |
| 1.1.9 | B✓✓ | |
| 1.1.10 | C✓✓ | (10 x 2) (20) |
- 1.2
- | | | |
|-------|---------------------------------|-------------|
| 1.2.1 | Blastocyst✓/Blastula | |
| 1.2.2 | Tropism✓ | |
| 1.2.3 | Amniotic✓ fluid | |
| 1.2.4 | Vasodilation✓/vascular dilation | |
| 1.2.5 | Apical dominance✓ | |
| 1.2.6 | Cervix✓ | |
| 1.2.7 | Hypothalamus✓ | |
| 1.2.8 | Abscisic acid✓ | |
| 1.2.9 | Peripheral✓ nervous system | (9 x 1) (9) |
- 1.3
- | | | |
|-------|----------------|-------------|
| 1.3.1 | Both A and B✓✓ | |
| 1.3.2 | A only✓✓ | |
| 1.3.3 | B only✓✓ | (3 x 2) (6) |

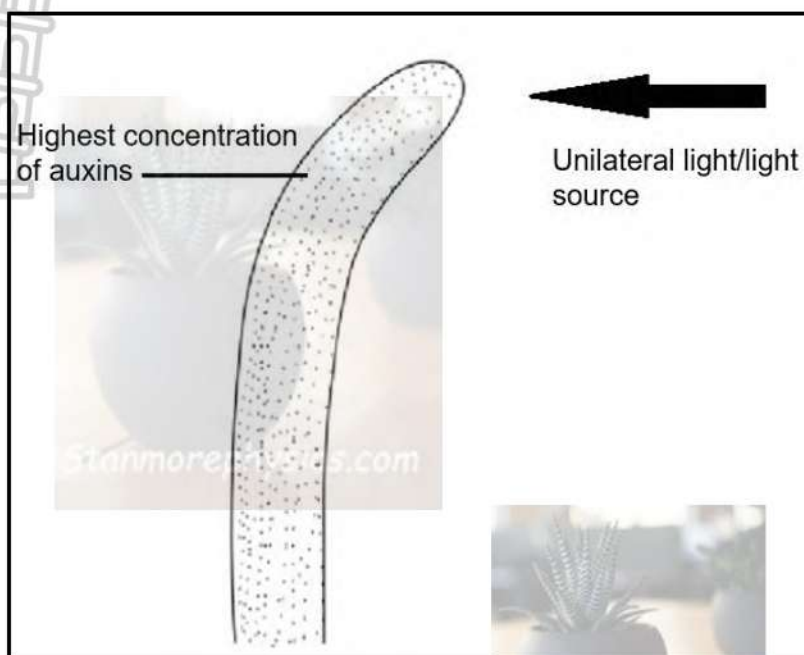
- 1.4 1.4.1 (a) D✓ -Yolk✓ sac (2)
 (b) C✓ -Allantois✓ (2)
 (c) A✓ -Chorion✓ (2)
 (d) B✓ -Amnion✓ (2)
(8)
- 1.5 1.5.1 Spinal cord✓ (1)
 1.5.2 Ventral root✓ of spinal nerve (1)
 1.5.3 - Meninges✓
 - Vertebrae✓/vertebral column/bone
 - Cerebrospinal fluid✓ Any (1)
(Mark first ONE only)
- 1.5.4 - Sensory✓ neuron
 - Inter✓ neuron/connector neuron
 - Motor✓ neuron (Correct order✓) (4)
(7)

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1



Criteria for marking the diagram:

Criteria	Mark allocation
Plant stem growing towards light (D)	1
Light source/arrow included in diagram (L)	1
Hormone:	
Correct area with the highest concentration of hormone (HA)	1
Correct name of hormone (HN)	1

(4)

PLEASE NOTE THAT THE LIGHT SOURCE CAN COME FROM THE LEFT.

- 2.2
- 2.2.1 (a) Uterus✓ (1)
(b) Vagina✓/Birth canal (1)
- 2.2.2 (a) A✓ -Fallopian tube✓ (2)
(b) E✓ -Endometrium✓ (2)
- 2.2.3 (a) Oestrogen✓ (1)
(b) Progesterone✓ (1)
(c) -The (periodic) shedding of the endometrium/thickened lining of the uterus✓ (and blood vessels)
- through the vagina✓ (2)
- OR**
- The endometrium will thicken✓
-due to secretion of oestrogen✓



(d) Woman **2✓/2** (1)

(e) -The progesterone✓/hormone **II** levels of woman **2**
 -is high/keeps increasing towards day 28✓/Day **R** (2)

2.2.4

(a) FSH✓/follicle stimulating hormone
 LH✓/luteinising hormone (2)

(NOTE: Give credit for **Oxytocin** although not required by the Examination Guidelines)

- (b) - Lower levels of FSH✓
 - will inhibit the development of a Graafian follicle✓
 - Lower levels of LH✓
 - will inhibit/prevent ovulation and✓
 - the formation of the corpus luteum✓

Any

(NOTE: If candidates answer Oxytocin in Q.2.2.4(a), credit (4)
 if the affected function is correct)

(19)

2.3

2.3.1

Testes✓/testicles (1)

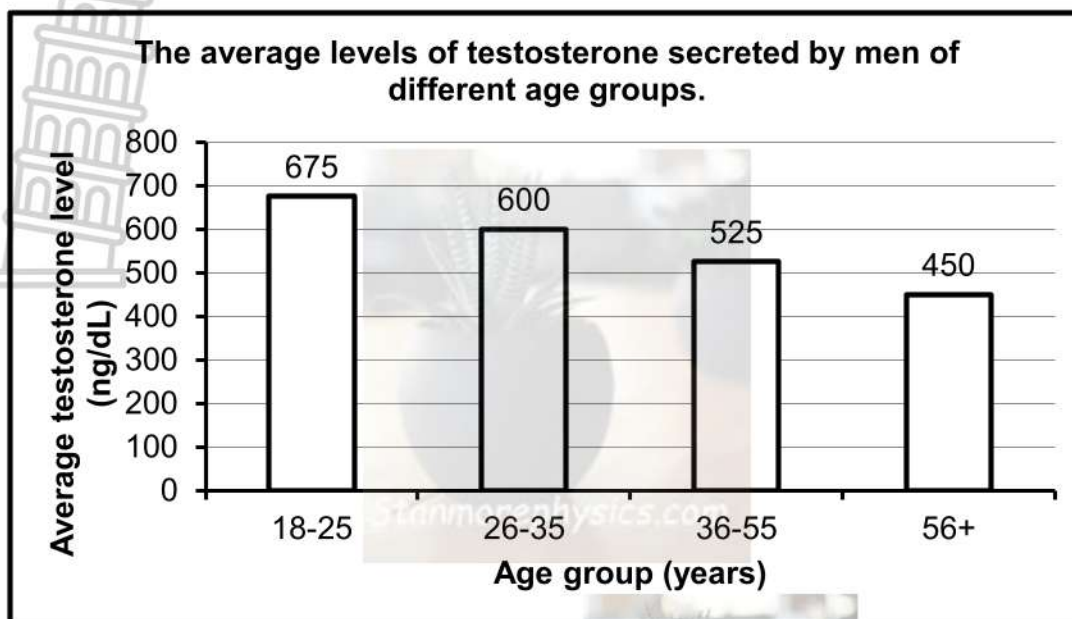
2.3.2

- Development of the male secondary sexual characteristics✓/example
 - Stimulates spermatogenesis✓/the formation/maturation of sperm cells

(Mark first TWO only) (2)



2.3.3



Criteria for marking the graph:

Criteria	Mark allocation
Type of graph: Bar graph is drawn (T)	1
Caption of the graph includes both variables (C)	1
Correct labels for X-axis and Y-axis and correct units for X-axis and Y-axis (L)	1
Equal space and width of bars for X-axis and correct scale for Y-axis (S)	1
Plotting: (P)	
1 – 3 co-ordinates are plotted correctly	1
All 4 co-ordinates are plotted correctly	2

(6)

PLEASE NOTE:

If a histogram or line graph is drawn, marks will be lost for:

- Type of graph
- Scale

If axes are transposed:

- Can get all marks if labels are also swapped and bars are horizontal
- If labels are not corresponding, then:
 - Marks will be lost for labels and scale
 - Plotting can get credit if co-ordinates are correct for given labels



2.3.4

Men from younger age groups have higher testosterone levels✓✓ than men of older age groups.

OR

Men from older age groups have lower testosterone levels✓✓ than men of younger age groups

(2)

(11)

2.4

2.4.1

The maintenance of a constant, internal environment✓ (within narrow limits), despite changes that take place internally and externally✓

(2)

2.4.2

Pancreas✓

(1)

2.4.3

- High blood sugar✓
- Extreme thirst✓
- Rapid and deep breathing✓
- Frequent urination✓
- Nausea✓
- Coma✓
- Death ✓

(Mark first TWO only)

Any (2)

2.4.4

- The acidic build up✓/ketones✓
- stimulates the medulla oblongata✓
- which stimulates rapid and deep breathing to **remove more** carbon dioxide✓/CO₂
- making the blood **less** acidic✓/increase the pH

Any (3)

2.4.5

- The pancreas is stimulated to secrete **more** insulin✓
- which stimulates the absorption of glucose from the blood✓/into the cells and the
- conversion of glucose to glycogen in the liver and muscles✓
- Glucose levels decrease✓/ return to normal

Any (3)

2.4.6

- They drink a lot of water due to extreme thirst✓
- High levels of water in the blood are detected by the hypothalamus✓ and the
- the pituitary secretes **less (no)** ADH✓/antidiuretic hormone
- Renal tubules (collecting ducts and distal convoluted tubules in the kidney) become **less** permeable✓
- **Less** water is reabsorbed into the blood✓ and frequent urination takes place.

(5)

(16)**[50]**

QUESTION 3

- 3.1 3.1.1 (a) Cerebrum✓ (1)
(b) Medulla oblongata✓ (1)



- 3.1.2 (a) - Conduct impulses between the two hemispheres✓
/connects the two hemispheres of the cerebrum
- for communication✓ between the two hemispheres (2)
(b) - It coordinates voluntary movement✓ to
- ensure that different muscle groups work together✓/
make smooth movement possible

OR

- It controls muscle tone✓ to
- to maintain balance and posture✓ Any (1 x 2) (2)
(Mark first ONE only)

- 3.1.3 Alzheimer's✓ disease (1)
(7)



3.2

SYMPATHETIC NERVOUS SYSTEM	PARASYMPATHETIC NERVOUS SYSTEM
Increases heart rate✓	Decreases heart rate✓
Constricts blood vessels in the skin✓/vasoconstriction	Dilates blood vessels in the skin✓/vasodilation
Increases blood pressure✓	Decreases blood pressure✓
Widens bronchioles✓	Narrows bronchioles✓
Decreases peristalsis✓	Increases peristalsis✓
Causes relaxation of the bladder wall✓	Causes contraction of the bladder wall✓
Stimulates sweat secretion✓	Does not stimulate sweat secretion✓
Dilates pupils✓	Constricts pupils✓
Stimulates secretion of adrenalin✓/During stressful conditions/fight or flight	Does not stimulate secretion of adrenalin✓/during calm conditions
Increases breathing rate✓	Decreases breathing rate✓
Increases blood flow to skeletal muscles✓/ supply of glucose	Decreases blood flow to skeletal muscles✓/supply of glucose
Increases metabolic rate✓	Decreases metabolic rate✓

- (Mark first TWO only)** Table (1) plus any (2 x 2) (5)

- 3.3 3.3.1 Motor✓ neuron (1)
- 3.3.2 (a) B✓ – Dendrite✓ (2)
(b) A✓ – Axon✓ (2)
- 3.3.3 - The presence of a myelin sheath✓
to insulate the axon✓/allow conduction of impulses
- A long axon✓
to transmit impulses over long distances✓ Any (1 x 2) (2)
(Mark first ONE only)



- 3.3.4 Synapse✓ (1)
- 3.3.5 - It ensures that the impulse moves in one direction only✓
- It prevents continuous stimulation of the neurons✓
- It ensures that the impulse is transmitted from the sensory neuron to the motor neuron✓/from one neuron to the next (2)
Any



(10)

- 3.4 3.4.1 (a) Cornea✓ (1)
(b) Suspensory ligaments✓ (1)
(c) Sclera✓ (1)

- 3.4.2 (Diagram) I✓ (1)

- 3.4.3 Concave✓/biconcave/divergent/minus (1)

- 3.4.4 **LONG-SIGHTEDNESS (DIAGRAM I):**
- A person can **see** distant objects but is unable to see nearby objects✓ clearly
- An **eyeball** that is too short✓ (rounded)/ the cornea not being curved enough for the length of the eyeball/ the inability of the lens to become more convex
- the **light rays** focus behind the retina✓/image falls behind retina

SHORT-SIGHTEDNESS (DIAGRAM II):

- A person can **see** nearby objects but cannot see distant objects✓ clearly
- An **eyeball** that is too long✓/ the cornea being too curved for the length of the eyeball/ the inability of the lens to become less convex
- the **light rays** focus in front of the retina✓/image falls in front of retina

(6)

DO NOT PENALISE IF ANSWER IS IN THE FORM OF A TABLE OR COMPARED PER DIFFERENCE.

(11)

- 3.5
- The pinna traps and directs sound waves into the auditory canal✓
 - towards the tympanic membrane
 - The tympanic membrane vibrates✓ and
 - causes the ossicles to vibrate✓
 - The ossicles (hammer, anvil and stirrup) amplify and transmit the vibrations to the oval window✓
 - The vibrating oval window causes pressure waves in the cochlea✓
 - The organ of Corti/ hair cells is stimulated✓ and
 - the stimulus is converted into a nerve impulse✓
 - which is transmitted to the auditory nerve✓
 - The auditory nerve transmits the impulse to the cerebrum✓ for interpretation
- Any (7)
- 3.6
- 3.6.1 On top of the kidneys✓ (1)
- 3.6.2 Aldosterone✓
 Adrenalin✓ (2)
(Mark first TWO only)
- 3.6.3 (Resting blood glucose concentration)✓ (1)
- 3.6.4 To act as a control✓ for the investigation/to determine if glucose levels will be normal with normal cortisol levels (1)
- 3.6.5
- Each group had 5 participants✓
 - All participants fasted for 8 hours✓
 - The same machine was used to measure glucose✓ (2)
- Any
(Mark first TWO only)
- 3.6.6 The averages were calculated✓ (1)
(Mark first ONE only)
- 3.6.7
- Using more than 5 participants per group✓
 - Repeat the investigation✓
- (Mark first TWO only)** (2)
(10)
[50]

TOTAL SECTION B: 100
GRAND TOTAL: 150