



education

MPUMALANGA PROVINCE
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

LIFE SCIENCES P1

SEPTEMBER 2026

MARKS: 150

TIME: 2½ HOURS

This question paper consists of 18 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 number (1.1.1 to 1.1.10) in the ANSWER BOOK, for example 1.1.11 D.

1.1.1 The inner lining of the uterus where attachment of the embryo occurs, is ...

- A endometrium.
- B chorion.
- C yolk sac.
- D placenta.

1.1.2 The advantage of the testes located in the scrotum, outside the body cavity is ...

- A more sperm can be stored in the scrotum.
- B testes are better protected in the scrotum than in the body cavity.
- C sperm development is more efficient at temperatures below 36°C
- D there is more time for prostate secretions to be added to sperm

1.1.3 Ovulation is stimulated by an increase in the levels of ...

- A FSH.
- B oestrogen.
- C progesterone.
- D LH.

1.1.4 The gland in the male reproductive system of humans that produces an alkaline to counteract the acid environment of the vagina.

- A Seminal vesicle
- B Prostate gland
- C Cowper's gland
- D Endocrine gland

- 1.1.5 A grade 12 learner conducted an investigation to determine the effect of caffeine on reaction time.



The procedure was done as follows:

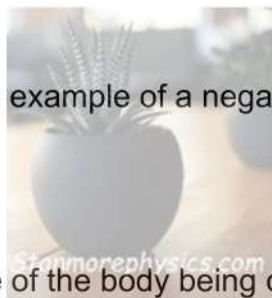
- 50 male volunteers of the same age participated.
- Their reaction times were measured using a computer program.
- They were all given 200 ml of an energy drink that contained caffeine.
- Their reaction times were measured again every 10 minutes for 2 hours.

Which ONE of the following increased the reliability of the results obtained?

- A Type of caffeine used
- B Gender of the volunteers
- C 50 volunteers used
- D Age of the volunteers

- 1.1.6 Which ONE of the following is an example of a negative feedback mechanism in the human body?

- A Colour vision
- B Osmoregulation
- C The activities of the right side of the body being controlled by the left hemisphere
- D Changes in the speed and direction of the body



- 1.1.7 Which ONE of the following shows the correct combination of the hormone with its target organ?

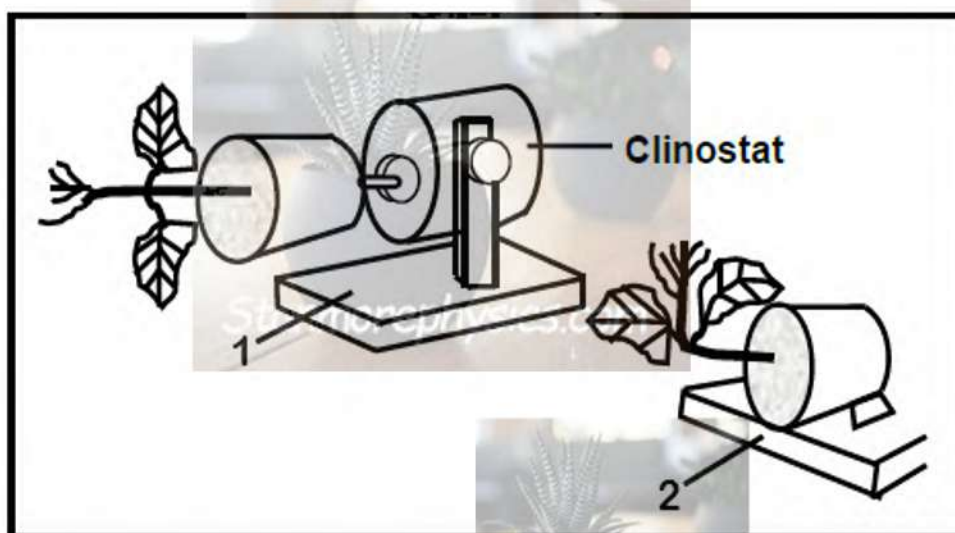
	Hormone	Target organ
A	LH	Uterus
B	Glucagon	Pancreas
C	TSH	Thyroid gland
D	Prolactin	Pituitary gland

- 1.1.8 Which of the following applies to the level of abscisic acid in seeds which normally germinate in spring?

- A It remains low from winter to spring.
- B It remains high from winter to spring.
- C It increases from winter to spring.
- D It decreases from winter to spring.

- 1.1.9 One plant was placed on a clinostat that rotated (Diagram 1) and the other was placed in a stationary position (Diagram 2). They left the apparatus in these positions inside a dark cupboard for two weeks before making the observations as indicated in the diagram below.

NOTE: A clinostat is an apparatus that is able to rotate.



What is the **stimulus** that led to the growth movement observed?

- A Light
- B Geotropism
- C Gravity
- D Phototropism

- 1.1.10 ADH is secreted by the pituitary gland. It affects the permeability of the walls of the renal tubules.

Which of the following options are correct to the function of ADH?

	→	→	→	→	
A	Lack of water	More ADH secreted	Renal tubules more permeable	More water reabsorbed	High volume of dilute urine
B	Lack of water	Less ADH secreted	Renal tubules more permeable	Less water reabsorbed	Low volume of concentrated urine
C	Excess water intake	Less ADH secreted	Renal tubules less permeable	Less water reabsorbed	high volume of dilute urine
D	Excess water intake	Less ADH secreted	Renal tubules less permeable	More water reabsorbed	High volume of dilute urine

(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 number (1.2.1 to 1.2.9) in the ANSWER BOOK.

1.2.1 The outermost extra-embryonic membrane surrounding the embryo.

1.2.2 The stage when secondary sexual characteristics develop in males and females.

1.2.3 The process by which gametes are produced through meiosis.

1.2.4 The hormone that prepares the human body for an emergency situation.

1.2.5 An upward growth movement of a plant stem, inhibiting the growth of lateral branches is ...

1.2.6 This hormone is inhibited by an increased level of thyroxine.

1.2.7 The part of the brain that is responsible for coordination of balance

1.2.8 Animal carbohydrate stored in the liver.

1.2.9 A branch of the autonomic nervous system that decreases the heartbeat back to normal .

(9 x 1) (9)

1.3 Indicate whether each of the statements 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 1.3.4) in the ANSWER BOOK.

COLUMN I		COLUMN II
1.3.1	Plant hormone that stimulates the germination of seeds.	A: Absciscic acid B: Gibberellins
1.3.2	The state of the blood vessels in the skin of a human when the environmental temperature is high.	A: Dilated B: Constricted
1.3.3	The maintenance of a constant internal environment in the body within certain limits.	A: Homeostasis B: Negative feedback mechanism
1.3.4	A liquid between the cornea and the lens in the human eye.	A: Vitreous humour B: Aqueous humour

(4 x 2) (8)



- 1.4 Indicate whether each of the statements 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 1.3.4) in the ANSWER BOOK.

COLUMN I		COLUMN II	
1.4.1	Plant hormone that stimulates the germination of seeds.	A:	Absciscic acid
		B:	Gibberellins
1.4.2	The state of the blood vessels in the skin of a human when the environmental temperature is high.	A:	Dilated
		B:	Constricted
1.4.3	The maintenance of a constant internal environment in the body within certain limits.	A:	Homeostasis
		B:	Negative feedback mechanism
1.3.4	A liquid between the cornea and the lens in the human eye.	A:	Vitreous humour
		B:	Aqueous humour

(4 x 2) (8)

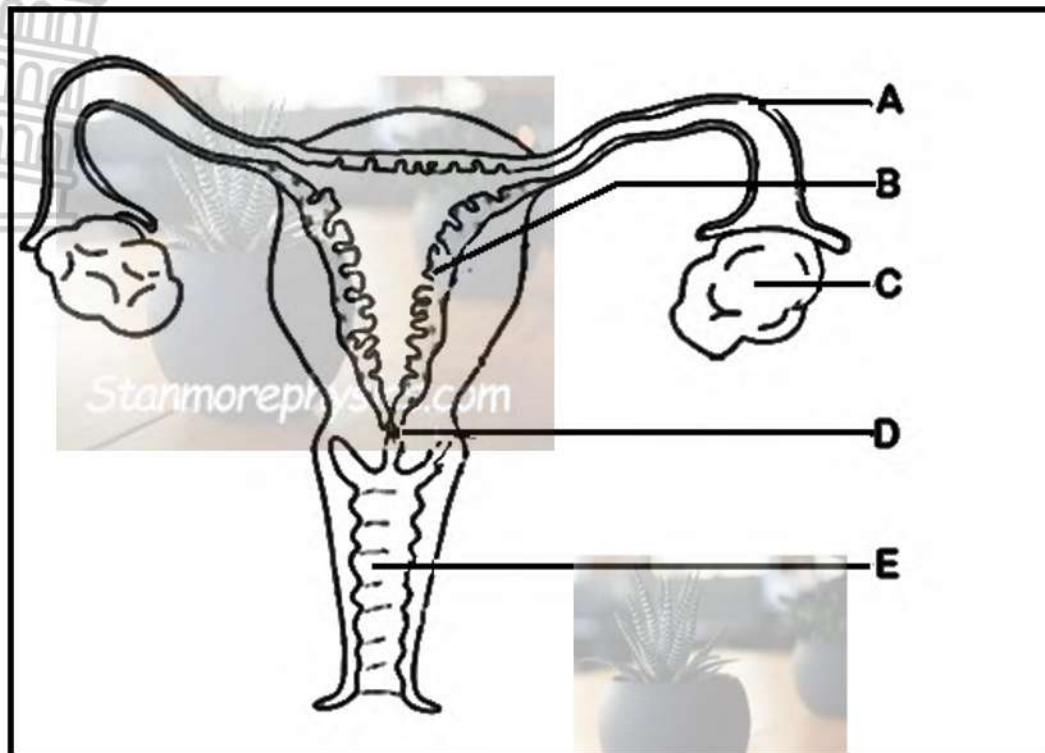
1.5 Read the text below on Platypuses mammal:

Platypuses, mammal endemic to eastern Australia, lay eggs and produce milk. After mating, a pregnant female builds a nest for her eggs in a long hole. After a gestation period of 21 days, she will lay 1 to 3 eggs in her nest. During the egg development period of about 10 days, a female holds the eggs pressed by her tail to her belly, while curled up. Newly hatched platypuses are vulnerable, blind, and hairless, and are fed by the mother's milk, that provides all the requirements for growth and development. They concentrate milk to their belly and feed their young by sweating it out.



- 1.5.1 Which type of the fertilisation occurs in these mammals? (1)
- 1.5.2 Identify the type of reproductive development in these mammals. (1)
- 1.5.3 State TWO characteristics of the platypuses for your answer in QUESTION 1.4.2. (2)
- 1.5.4 Describe parental care that the platypus display. (2)
- (6)**

- 1.6 The diagram below represents parts of the human female reproductive system.

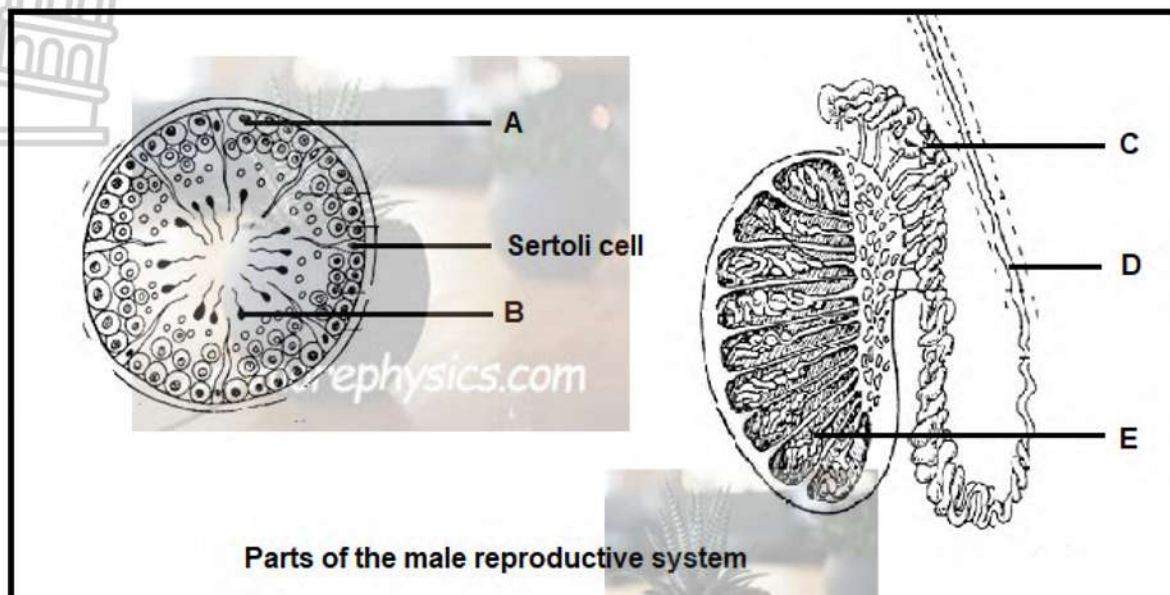


- 1.5.1 Identify part **D** (1)
- 1.5.2 State ONE function of part **E**. (1)
- 1.5.3 Identify the part that disintegrate or breaks down during menstruation. (1)
- 1.5.4 Name the type of gametogenesis taking place at **C** (1)
- 1.5.5 A woman had a cyst growing at **A**, which resulted in a complete blockage but she continued with her normal menstrual cycle.
- Explain why her menstrual cycle continued to be normal. (3)
- (7)

TOTAL SECTION A: 50

SECTION B**QUESTION 2**

2.1 The diagram below represents parts of the human male reproductive system.



2.1.1 Give the NAME of the parts labelled:

- | | | |
|-----|----------|-----|
| (a) | C | (1) |
| (b) | A | (1) |
| (c) | E | (1) |

2.1.2 Give ONE function of each of the parts:

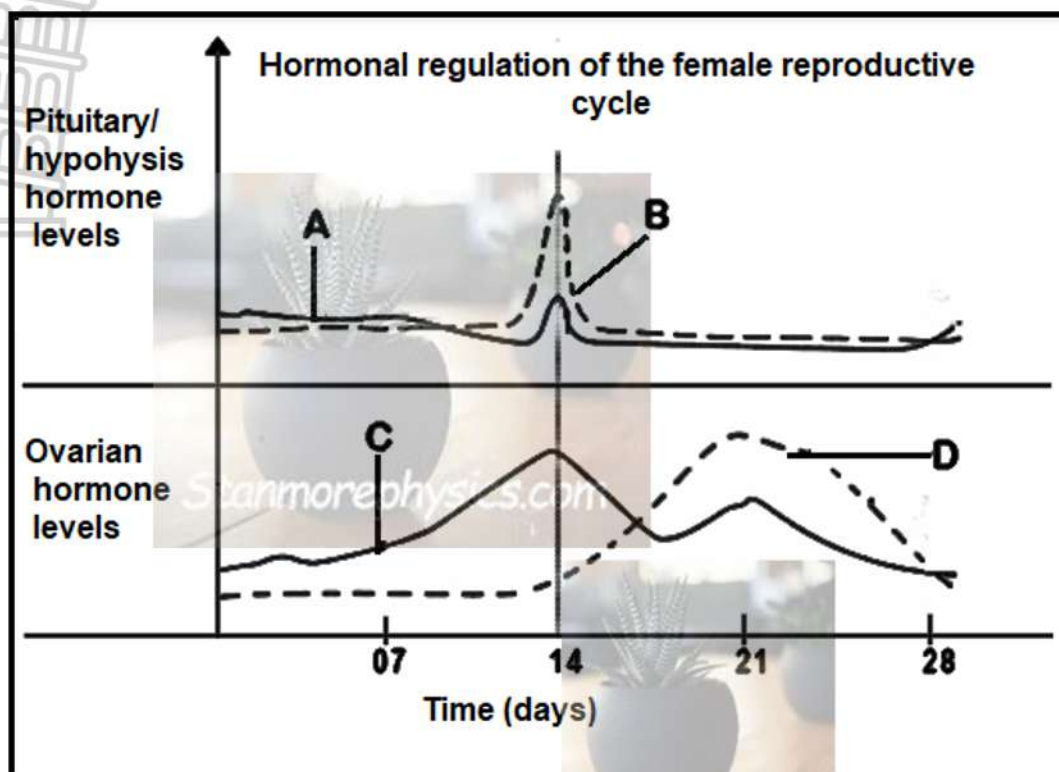
- | | | |
|-----|---------------|-----|
| (a) | D | (1) |
| (b) | Sertoli cells | (1) |

2.1.3 Draw a labelled diagram of structure **B**. (4)

2.1.4 Infertility in males could be due to a varicose (enlarged, twisted) veins around the testes that constricts them. Briefly explain how these can affect sperm production?

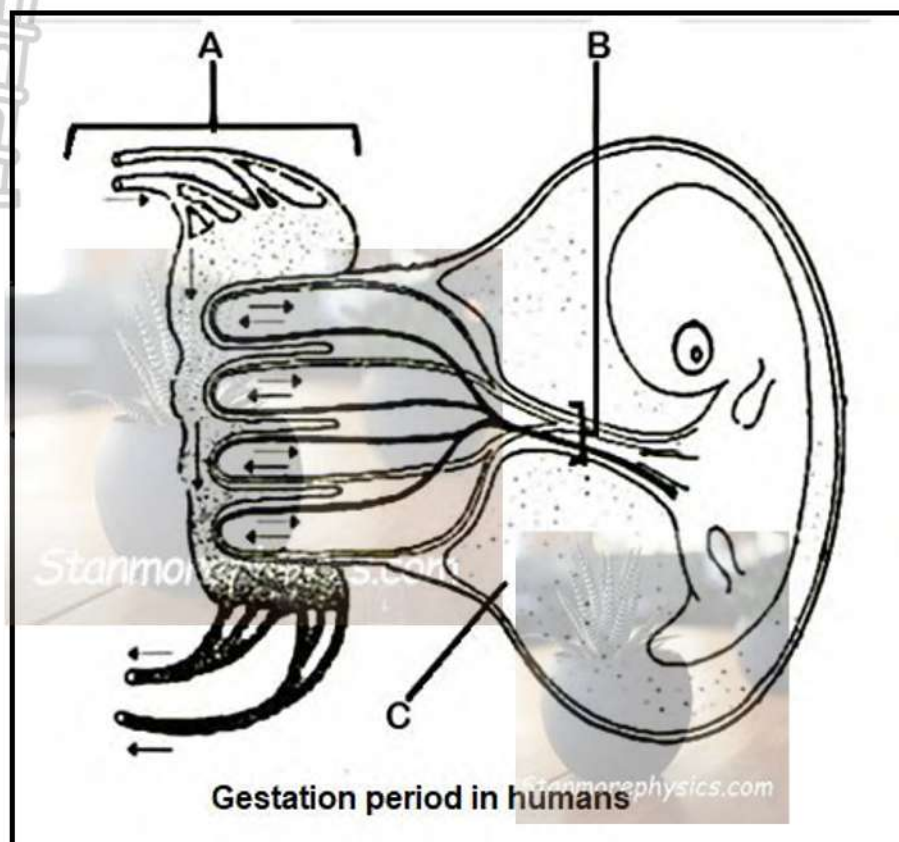
(2)
(11)

- 2.2 The graphs below, shows the levels of the hormones involved in the menstrual cycle in most women.



- 2.2.1 Identify hormone **B**. (1)
- 2.2.2 According to the graph, during which period of time is the level of hormone **C** lower than hormone **D**? (1)
- 2.2.3 Name and explain the relationship that exist between the hormones labelled **A** and **D** in the menstrual cycle. (4)
- 2.2.4 Describe the changes to one follicle found in the ovary during the 28 day cycle. (3)
- (9)

- 2.3 The diagram below shows a developing foetus during gestation in humans. The arrows indicate the flow of substances exchanged during the gestation period.



- 2.3.1 Define gestation (1)
- 2.3.2 Identify the parts labelled **A** and **B** (2)
- 2.3.3 State TWO ways in which the fluid labelled **C** protects the foetus during the gestation period. (2)
- 2.3.4 Name TWO structures that are present in the amniotic egg that are not present in the diagram above, as their function is performed by part **B**. (2)
- 2.3.5 Name any TWO systems in the foetus body that take over the functions of part **A** once the baby is born. (2)
- (9)**

- 2.4 Read the extract on an insulin investigation below and answer the questions that follow.

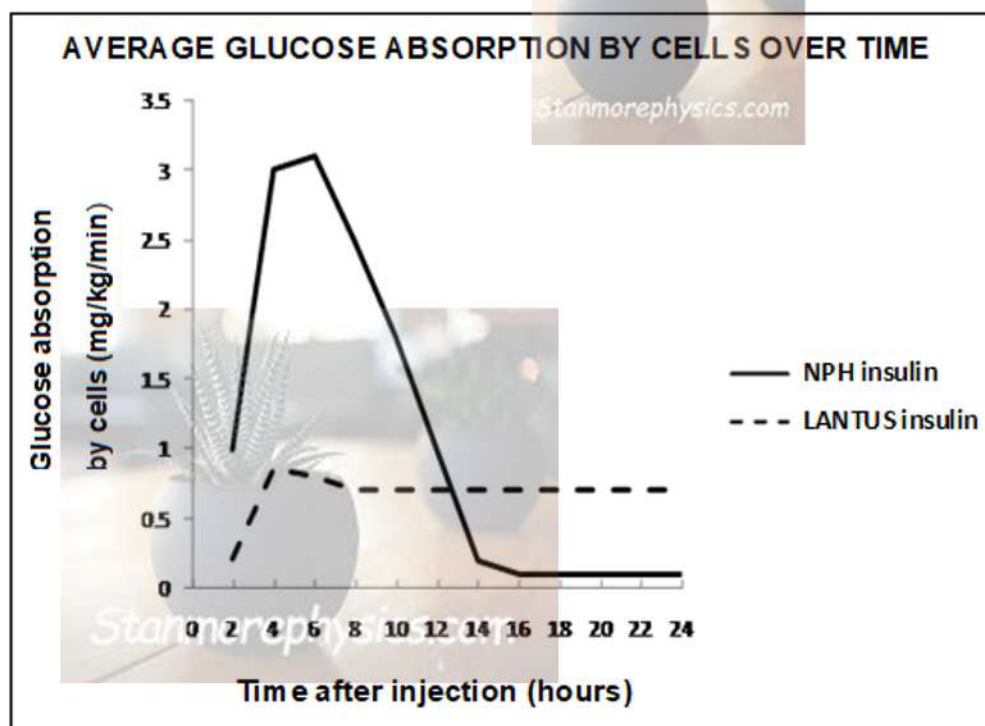
Insulin is the hormone that regulates blood glucose levels. Failure of the body to produce insulin results in diabetes mellitus. Patients with this condition must have regular injections of insulin. Two types of insulin are used, NPH insulin and LANTUS insulin.

Scientists wanted to establish which of these controls blood glucose levels for longer periods in insulin- dependent diabetic patients.

- They divided 20 patients with diabetes into two groups of 10 patients each.
- The one group was injected with NPH insulin, and the other group was injected with LANTUS insulin.
- All the patients received the same amount and concentration of insulin.
- The glucose absorption by cells was then measured every hour, over a period of 24 hours and the average calculated.

The insulin is regarded as effective when the glucose uptake by the cells is above 0,4mg/kg/min

The graph below shows the results obtained from this investigation.



- 2.4.1 Identify the independent variable in this investigation. (1)
- 2.4.2 Give ONE controlled variable other than those mentioned above, which could affect the results of the investigation. (1)
- 2.4.3 How long after the injection did the insulin remain effective with LANTUS? (1)

- 2.4.4 Which insulin caused the highest glucose absorption by cells? (1)
- 2.4.5 Explain why glucose absorption by the cells was used to measure the effectiveness of insulin. (2)
- 2.4.6 Explain the effect that high glucose absorption would have on blood glucose levels? (2)
- (8)
- 2.5 During break time at school, a grade 12 learner consumed chips with a lot of salt. This increased the salt levels in the blood of the learner. Describe how the learner's body restored the salt levels in the blood when it was above normal. (4)
- 2.6 A sports scientist wanted to find out how much water is lost by the human skin at different times of the day.

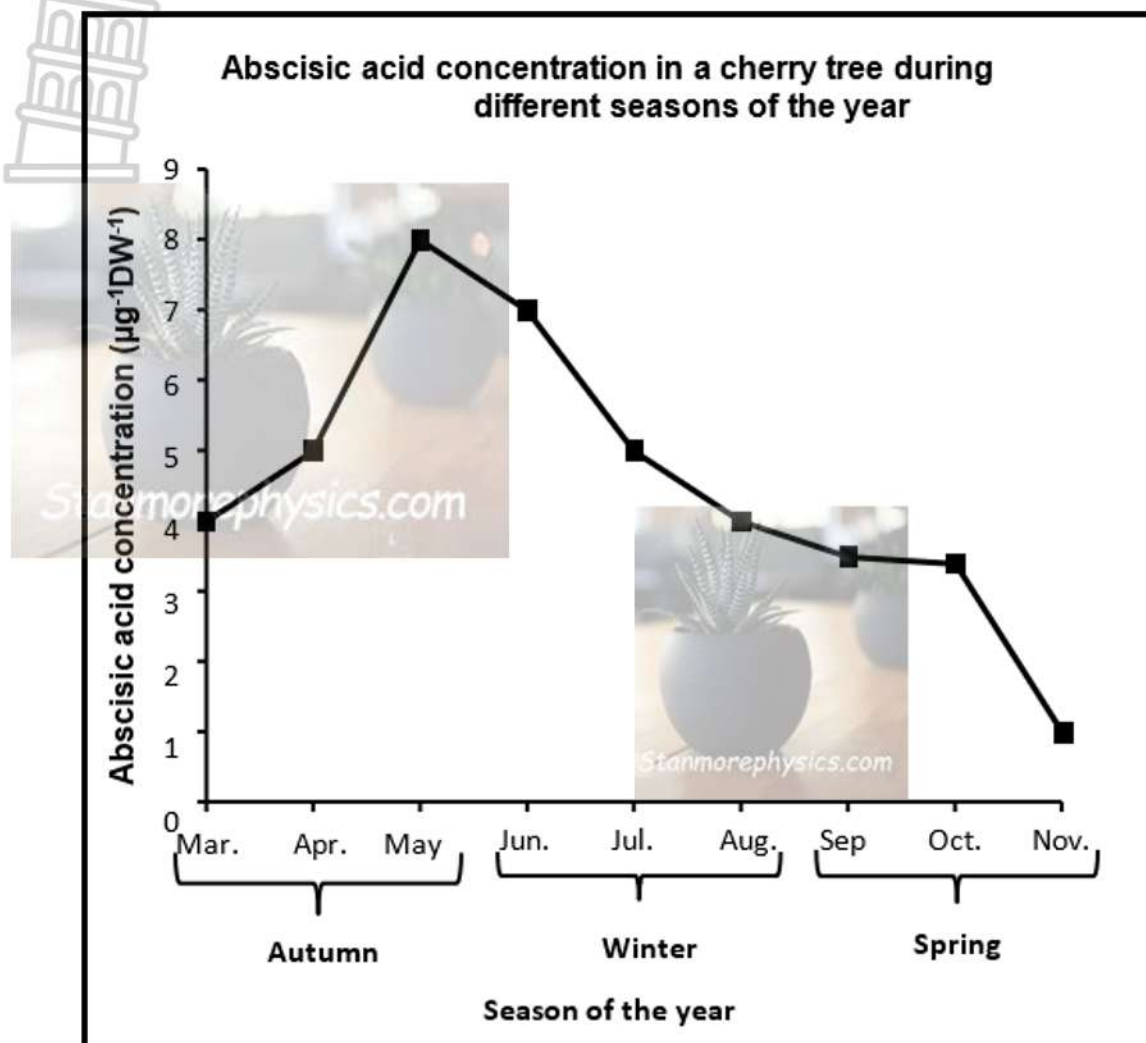
The following results were obtained from measuring the average volume of water secreted by 40 healthy participants on a day.

Time of day	Average water loss (ml/hour)
09:00–10:00	180
10:00–11:00	340
11:00–12:00	620
12:00–13:00	940
13:00–14:00	990
14:00–15:00	970
15:00–16:00	810

- 2.6.1 Name the gland and hormone responsible for control of water in the blood. (2)
- 2.6.2 From the table, state the time of the day when the participants lost the most water. (1)
- 2.6.3 Draw a histogram to represent the data in the table above. (6)
- (9)
- [50]

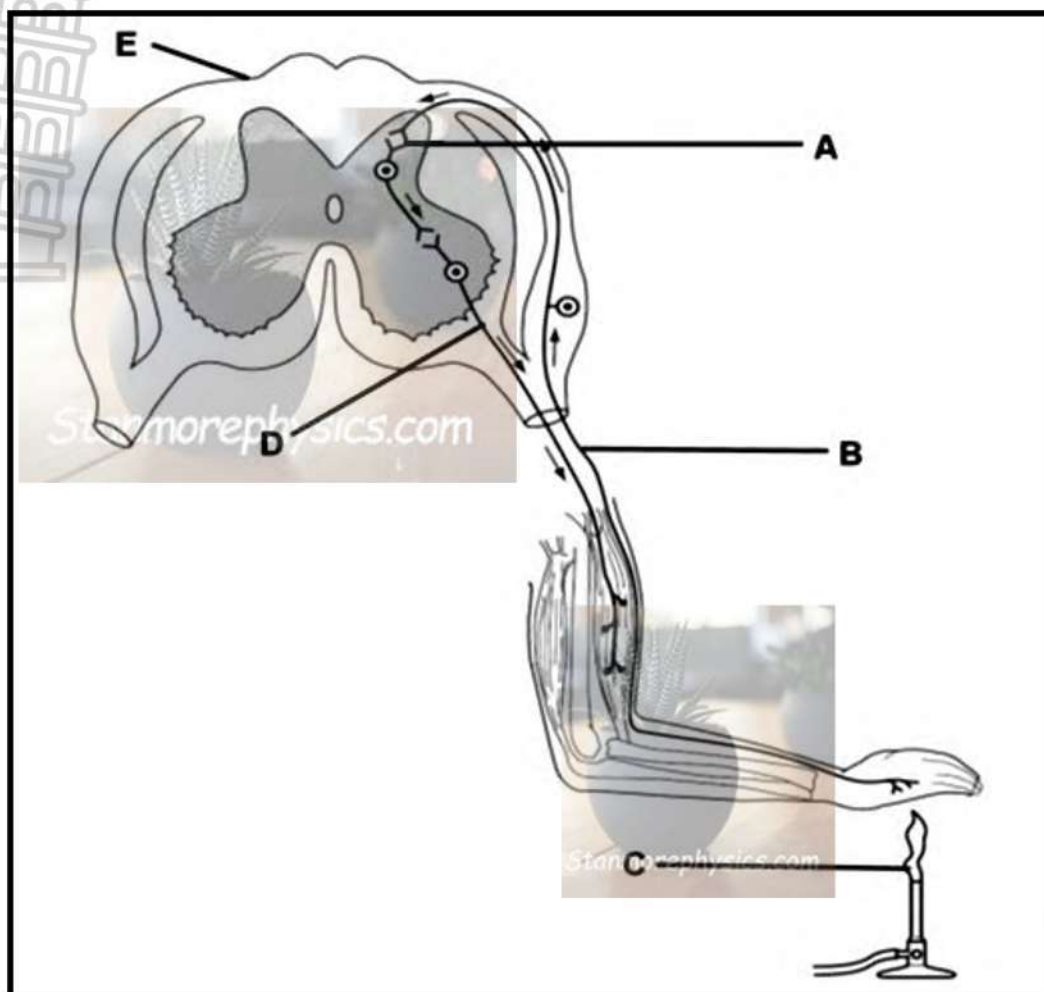
QUESTION 3

3.1 The graph below represents the concentration of abscisic acid in a cherry tree.



- 3.1.1 During which month was the abscisic acid concentration the lowest? (1)
- 3.1.2 Explain the trend of the graph from March to May. (3)
- 3.1.3 Suggest ONE reason for the dormancy in cherry trees during the winter months. (2)
- (6)**

3.2 The diagram below represents a reflex arc.



3.2.1 Apart from being the reflex centre, describe ONE additional function of part E. (2)

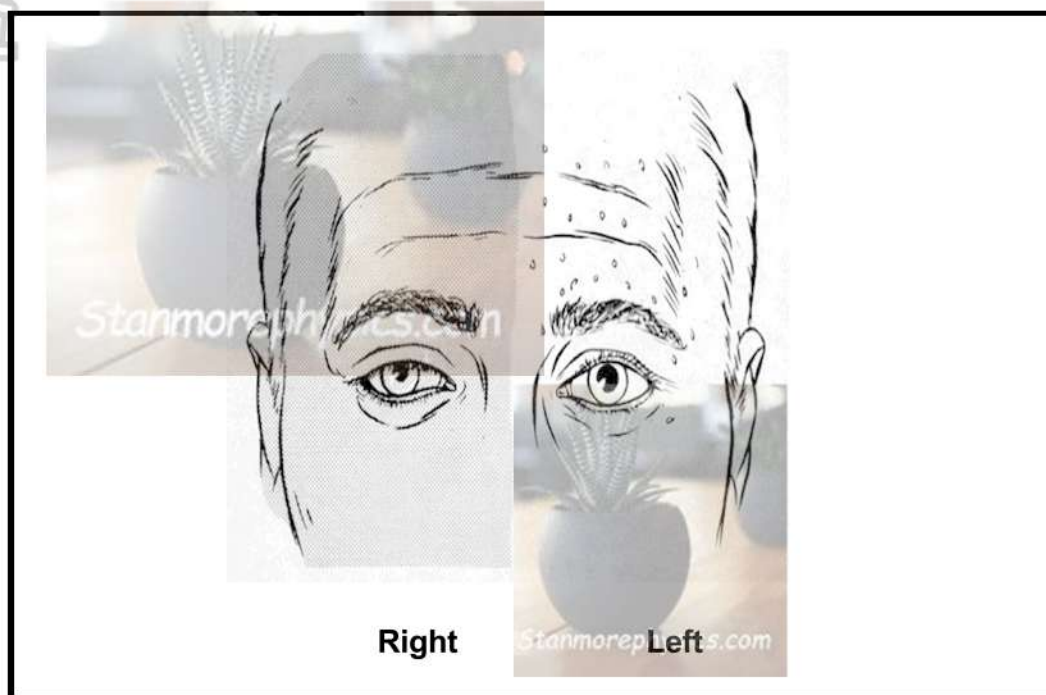
3.2.2 Identify the structure formed at part A and state TWO of its significances. (3)

3.2.3 Tabulate TWO visible structural differences between neurons B and D. (5)

(10)

- 3.3 Horner syndrome (Oculosympathetic palsy) is a condition that negatively affects parts of the sympathetic nervous response in the face and eye on one side of the body and is caused by a disruptive nerve in the brain.

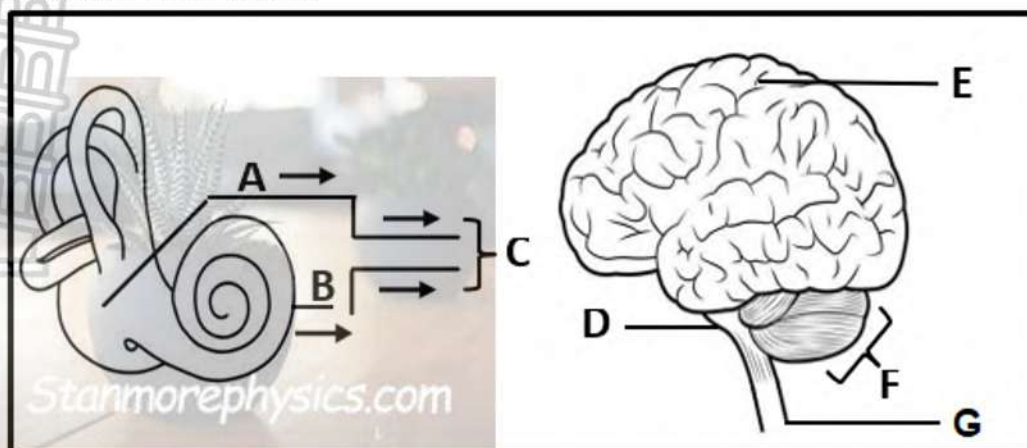
This condition may lead to decreased pupil size, a drooping eyelid and decreased sweating on the affected side of the face. Horner syndrome, however, does not affect a person's ability to focus on an object (near or far).



- 3.3.1 Which side of the face shown above is affected by Horner syndrome? (1)
- 3.3.2 Give ONE reason for your answer in QUESTION 3.3.1 by referring to the text and the diagram. (1)
- 3.3.3 Name the part of the brain which interprets what you see. (1)
- 3.3.4 Name the part of the nervous system which controls the pupillary reflex. (1)
- 3.3.5 Describe the risk that the decreased pupil size in Horner syndrome may pose to a driver at night. (2)
- 3.3.6 Name and describe the process which allows a person with Horner syndrome to focus clearly on an object which was far away and is now less than 6 m from them. (4)

(10)

- 3.4 The diagrams below represent the transmission of impulses from a structure in the inner ear to the brain.



- 3.4.1 Identify the parts labelled:

(a) **D**

(1)

(b) **F**

(1)

- 3.4.2 Use the letter(s) **A- G** to show the transmission of impulses from a structure in the inner ear to the brain to maintain balance when a person is dancing.

(2)

- 3.4.3 Give TWO functions of the part labelled **G**

(2)

- 3.4.4 Describe the location of the corpus callosum.

(2)

- 3.4.5 A learner suffered a brain injury during a soccer match. He could still breathe properly but he experienced occasional loss of memory and balance.

Explain why:

(a) The learner could still breathe properly

(2)

(b) It is possible that the injury affected part **F**

(2)

(12)

3.5 Study the investigation below on hearing loss and the influence of hearing aids.

Hearing loss is a partial or total inability to hear in one or both ears. It can occur when there is a problem with the auditory system which may be caused by exposure to loud noise, aging, infection, or it may be hereditary. Hearing loss is diagnosed when hearing tests find that a person is unable to hear sounds under 25 decibels in at least one ear.

Sound intensity is measured in decibels (dB). The lower the decibels the softer the sound and the higher the decibels, the louder the sound.

The information below shows the minimum audible sound intensity ranges used to classify different hearing abilities.

- Normal hearing (0 – 25 dB)
- Mild hearing loss (26 – 40 dB)
- Moderate hearing loss (41 – 70 dB)
- Severe hearing loss (71 – 90 dB)
- Profound hearing loss (greater than 90 dB)

Researchers have reported the effect of hearing aids on audible sound intensity over a twelve-month period for persons diagnosed with severe hearing loss. The amplification of the hearing aid was adjusted (increased) every 3 months and the audible sound intensity tested. The results are shown in the table below.

Time (Months)	Minimum audible sound intensity (dB)
3	78
6	41
9	30
12	15

3.5.1 Name the part of the ear that:

- (a) Amplifies sound vibrations by means of bone tissue (1)
- (b) Contains the receptor for hearing (1)

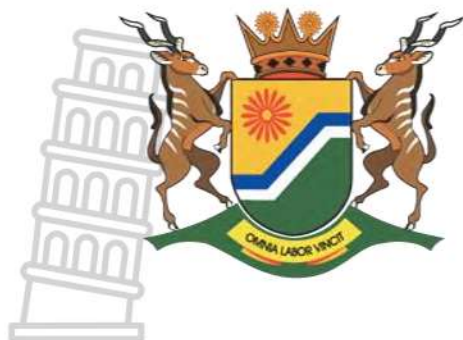
3.5.2 Explain how hearing loss is caused by a damaged tympanic membrane. (5)

3.5.3 Calculate the percentage decrease of minimum audible sound intensity (dB) from the month 3 to 12. (3)

3.5.4 Give evidence which shows that increasing the amplification of the hearing aid improved the person's hearing after 12 months. (2)

(12)

[50]
TOTAL SECTION B: 100
GRAND TOTAL: 150



education

**MPUMALANGA PROVINCE
REPUBLIC OF SOUTH AFRICA**

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

**LIFE SCIENCES P1
SEPTEMBER 2026
MARKING GUIDELINES**

MARKS: 150

This marking guideline consists of 12 pages.

PRINCIPLES RELATED TO MARKING LIFE SCIENCES

1. **If more information than marks allocated is given**
Stop marking when maximum marks 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 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 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 provincial 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**

Marking guidelines will allocate marks for units separately, except where it is given in the question.

16. **Be sensitive to the sense of an answer, which may be stated in a different way.**

17. **Caption**

All illustrations (diagrams, sketches, 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 learners' 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 is applicable to all official languages.

19. **Changes to the memorandum**

No changes must be made to the marking guideline without consulting the cluster leader who in turn will consult with the subject advisor.



SECTION A

QUESTION 1

- 1.1 1.1.1 A ✓✓
1.1.2 C ✓✓
1.1.3 D ✓✓
1.1.4 B ✓✓
1.1.5 C ✓✓
1.1.6 B ✓✓
1.1.7 C ✓✓
1.1.8 D ✓✓
1.1.9 C ✓✓
1.1.10 C ✓✓ 10 x 2 (20)
- 1.2 1.2.1 Chorion✓
1.2.2 Puberty✓
1.2.3 Gametogenesis✓
1.2.4 Adrenalin✓
1.2.5 apical dominance✓
1.2.6 TSH✓ / Thyroid stimulating hormone
1.2.7 Cerebellum✓
1.2.8 Glycogen✓
1.2.9 parasympathetic✓ nervous system (9 x 1) (9)
- 1.3 1.3.1 B only ✓✓
1.3.2 A only ✓✓
1.3.3 A only ✓✓
1.3.4 B only ✓✓ (4 x 2) (8)
- 1.4 1.4.1 Internal✓ fertilization (1)
1.4.2 Altricial✓ (1)
1.4.3 - They are vulnerable✓
- blind✓
- hairless ✓
(Mark first TWO only) (2)
1.4.4 - They feed their young by giving them concentrated milk✓
- By sweating it out ✓/through their sweat glands
- They incubate their eggs✓
- They build nests for their young✓ (2)
(6)

1.5 1.5.1 Cervix✓ (1)



- 1.5.2 - Acts as a birth canal✓
- Receive sperms cells✓/penis during copulation
- Act as a passage for menstrual blood✓

Any (1)

1.5.3 (Part) B✓ (1)

1.5.4 Oogenesis✓ (1)

- 1.5.5 - Part A/ Fallopian tube only allows the passage of an ovum✓/site for fertilisation
- Which has no effect✓ on the menstrual cycle
- Since it is controlled by hormones✓/ovaries are still producing hormones
- Which are transported by blood✓

Any (3)
(7)

TOTAL SECTION A: 50

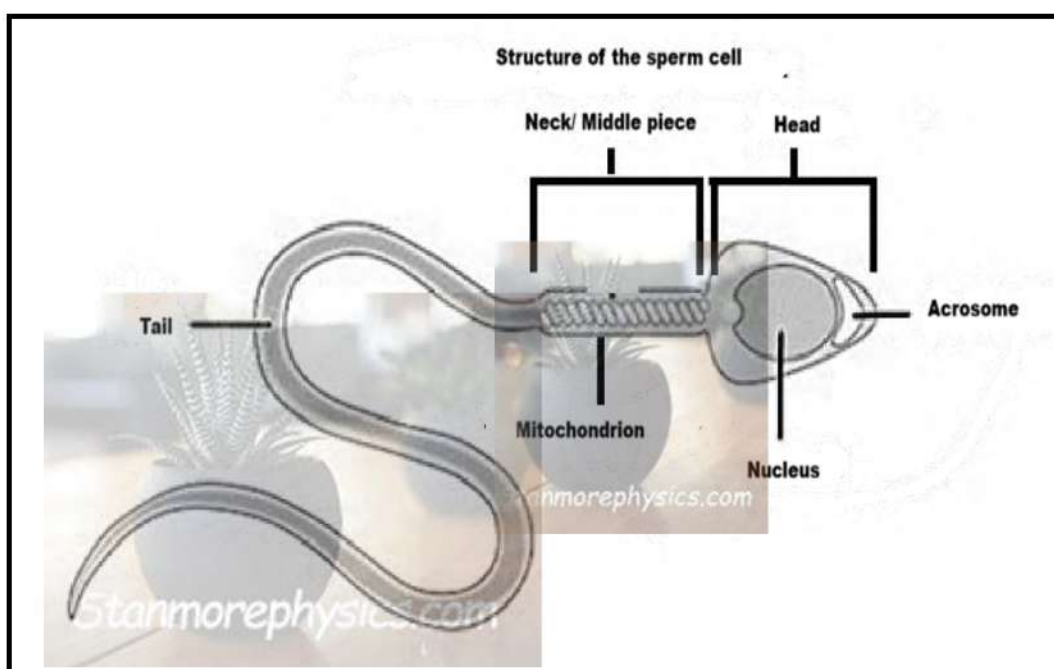


SECTION B
QUESTION 2

- 2.1 2.1.1 (a) Epididymis✓ (1)
(b) Germinal epithelium✓/spermatogonia (1)
(c) Seminiferous tubules✓ (1)

- 2.1.2 (a) Carries/ transport the sperm cells✓ from the epididymis into the ejaculatory duct. (1)
(b) Provide nutrients for the (developing) sperm cells✓ (1)

2.1.3



Description	Mark allocation
Caption (C)	✓
Drawing (D)	✓
Any 2 labels(L)	✓✓

(4)

2.1.4

- Sperms are not going to be produced normally✓
- leading to low sperm count/sperm cells are negatively affected
- Increases temperature of the testis✓
- which is not optimal for sperm production✓

(2)

(11)

2.2 2.2.1 Luteinising hormone✓/ LH (1)

2.2.2 Day 17 - 28 ✓ (accept Day 16 – 28) (1)

2.2.3 **Negative feedback mechanism✓***

- Increased levels of hormone **D✓**/ progesterone will inhibit the pituitary gland✓ from secreting hormone **A✓**/ follicle stimulating hormone

OR

- When levels of hormone **D/** Progesterone decreases✓,
- then hormone **A/** follicle stimulating hormone will be **secreted** from the pituitary gland✓
- and its level increases ✓

1*(compulsory mark) + Any 3 (4)

- 2.2.4
- Under the influence of FSH✓/ follicle stimulating hormone,
 - the follicle in the ovary grows and matures✓ into the graafian follicle.
 - approximately on day 14 the matured Graafian follicle burst open,
 - and releases the ovum✓, the process is known as ovulation.
 - under the influence of LH✓,
 - the remains of the Graafian follicle will be converted to corpus luteum✓

Any (3)
(9)

2.3 2.3.1 Gestation – the period of development of the foetus in the uterus from conception/implantation/fertilisation until birth✓ (1)

2.3.2 A – Placenta✓
B - Umbilical cord✓ (2)

- 2.3.3
- Provides watery medium for the foetus to move freely✓ and develop/ allows movement for growth and development
 - Prevents dehydration of the embryo✓/keeps embryo hydrated
 - Protects the foetus against temperature fluctuation✓/Keeps foetus at a constant temperature
 - Acts as shock absorber✓/protects the foetus against mechanical injury

Any (2)

2.3.4 - Allantois ✓
-Yolk sac✓ (2)

2.3.5

- Excretory system✓,
- Respiratory system✓,
- Digestive system✓,
- Endocrine system✓

Any (2)
(9)

2.4 2.4.1 Type of insulin✓ (1)

- 2.4.2
- Health status✓
 - Age✓
 - Gender✓
 - Diet✓
 - Fitness levels✓
 - Blood glucose levels ✓

Any (1)

2.4.3 21 - 22✓ hours (1)

2.4.4 NPH✓ (1)

2.4.5 Insulin reduces blood glucose levels✓ by increasing ✓the glucose absorption by cells. (2)

2.4.6 High glucose absorption will cause more glucose to enter the cells✓/liver cells/muscle cells and therefore cause a decrease in blood glucose levels✓ (2)

(8)

- 2.5
- Receptors in the kidney detected✓ the increase
 - And stimulated the adrenal gland✓
 - (Adrenal gland) secreted less aldosterone✓
 - Loop of Henle/ renal tubules became less permeable✓
 - Less salt was reabsorbed back into the blood stream✓
 - More salt was excreted✓/more concentrated/hypertonic
 - Salt levels decreased back to normal✓

Any (4)

(4)

[50]

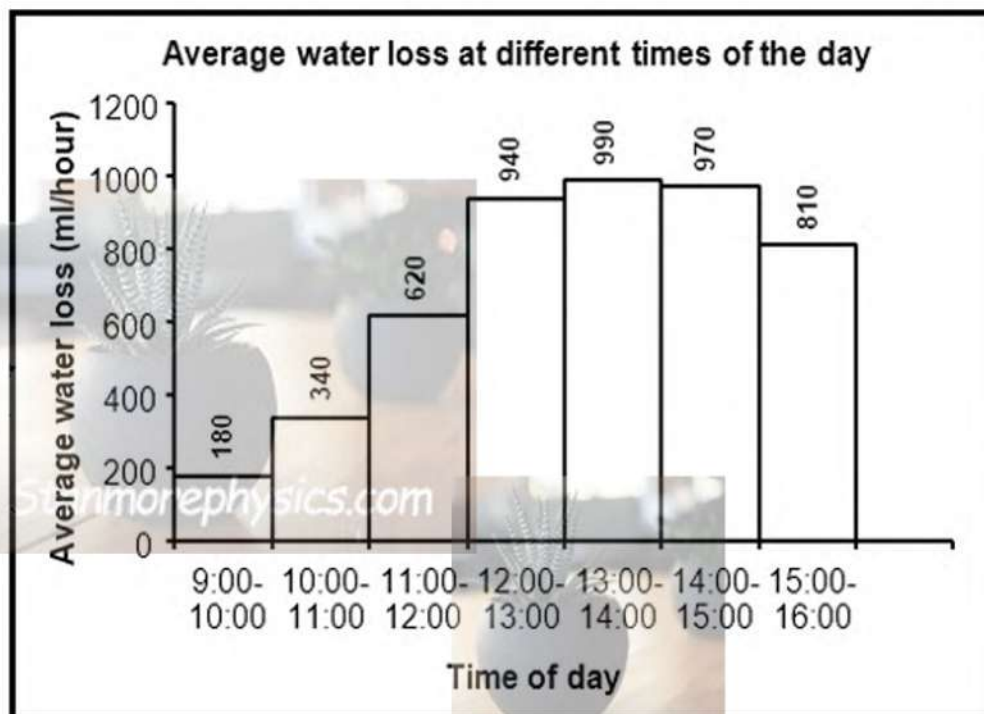
- 2.6 2.6.1 Gland – Hypothalamus✓
Hormone - ADH✓/ antidiuretic hormone

(2)

- 2.6.2 (13:00 – 14:00)✓

(1)

- 2.6.3



Guideline for assessing the graph

Criteria	ELABORATION	MARK
Correct type of graph (T)	Histogram drawn	1
Caption of graph (C)	Both variables included	1
Axes labels (L)	X- and Y-axis correctly labelled with units	1
Scale for X- and Y-axis (S)	- Same width of bars for X-axis and - Correct scale for Y-axis	1
Plotting of bars (P)	1 to 6 bars plotted correctly All 7 bars plotted correctly	1 2

(6)

(9)
[50]

QUESTION 3

3.1 3.1.1 November✓ (1)

- 3.1.2 - The concentration of abscisic acid increases✓
- To stimulate the abscission✓ /falling of leaves
- To prepare the tree for dormancy✓ (3)

- 3.1.3 - Less sunlight✓/ less water/ cold conditions therefore
- Decreased photosynthesis✓/ reduced transpiration/ lower energy demand/ low growth rate
(Mark first ONE only) Any (1 x 2) (2)
(6)

- 3.2 3.2.1 -Transmits impulses✓from receptors to the brain ✓
-Transmits impulses ✓ from the brain to effectors ✓
-It helps coordinate muscle movements and balance ✓ by transmitting impulses between the brain and body. ✓
(Mark first ONE only) (Max 2) (Any 1 x 2) (2)

- 3.2.2 - Synapse ✓*
- It ensures that the impulse moves in one direction only✓/It ensures that the impulse is transmitted from the sensory neuron to the motor neuron
- It prevents continuous stimulation of the neurons✓/filter weak/unimportant/constant impulses
- Allow impulse to be transmitted to multiple neurons simultaneously✓
(Compulsory mark and ✓* and any TWO) (3)

3.2.3

B/ Sensory neuron	D/ Motor neuron
Unipolar✓	Multipolar✓
Shorter axon✓	Longer axon✓
Longer dendrites✓	Shorter dendrites✓
Cell body towards the middle✓	Cell body is at the beginning ✓

Table ✓+ (2 x 2) (5)
(10)

- 3.3 3.3.1 Right ✓ side (1)
- 3.3.2 Decreased pupil size ✓/drooping eyelid /decreased sweating
(Mark first ONE only) (1)
- 3.3.3 Cerebrum✓ (1)
- 3.3.4 Autonomic ✓ nervous system (1)
- 3.3.5 Radial muscle remain relaxed✓/do not contract
As pupil cannot dilate enough to let more light in ✓ there is a greater
risk of having an accident✓ at night, because it will be difficult to
see in the dark ✓/dim light. Any (2)
- 3.3.6 Accommodation ✓*
– Ciliary muscles contract ✓
– Suspensory ligaments slacken ✓
– Tension on the lens decreases ✓
– Lens becomes more convex ✓
– Increasing the refractive power of the lens ✓
– Forming a (clear) image on the retina ✓ Any (3 + 1* compulsory) (4)
(10)
- 3.4 3.4.1 (a) Medulla oblongata✓ (1)
- (b) Cerebellum✓ (1)
- 3.4.2 $A \rightarrow C \rightarrow F(\rightarrow G)$ ✓✓ (2)
- 3.4.3 - It conducts impulses between the brain and the receptors/
effectors✓
- Serves as a reflex centre for actions ✓ such as blinking, sneezing,
coughing etc. (2)
- 3.4.4 Between the two hemispheres of the cerebrum✓✓ (2)
- 3.4.5 (a) - Part D/ medulla oblongata which controls breathing✓
- was not injured✓ (2)
- (b) - The learner (occasionally) lost balance✓
- due to no coordination of voluntary movements✓ by part F (2)
(12)

- 3.5 3.5.1 (a) Ossicles✓ (1)
- (b) Cochlea✓ (1)
- 3.5.2 – Sound waves cannot be (effectively) converted to vibrations by the eardrum✓/tympanic membrane
– and the ossicles will not vibrate ✓/vibrate less
– therefore, the oval window will not vibrate ✓/vibrates less
– no/little pressure waves form✓ in the cochlea
– The Organ of Corti will pick up little or no stimulus ✓/pressure waves
– and little or no impulse will be carried by the auditory nerve ✓
– with little or no interpretation occurring in the cerebrum✓ Any (5)
- 3.5.3 $\frac{78 - 15}{78}] \times 100$ ✓
= 80.8 %✓/ 80.76% (3)
- 3.5.4 - After 12 months, the person could hear normal✓✓(0 – 25dB)/
-The person can hear 15 dB (2)
- TOTAL SECTION B: 100**
GRAND TOTAL: 150