basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

LIFE SCIENCES P1

NOVEMBER 2025

MARKS: 150

TIME: 2½ hours

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 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 hormone that prepares the body for an emergency is …

A aldosterone.
B progesterone.
C adrenalin.
D prolactin.

1.1.2 Which ONE of the following are functions of the placenta?

A Excretion and nutrition
B Gaseous exchange and protection against mechanical injury
C Nutrition and temperature regulation
D Temperature regulation and excretion

1.1.3 The table below shows the reaction time of four learners to a stimulus.

NAME OF LEARNER	REACTION TIME (SECONDS)
Temisha	0,7
Luke	0,6
Anika	0,8
Jordy	0,4

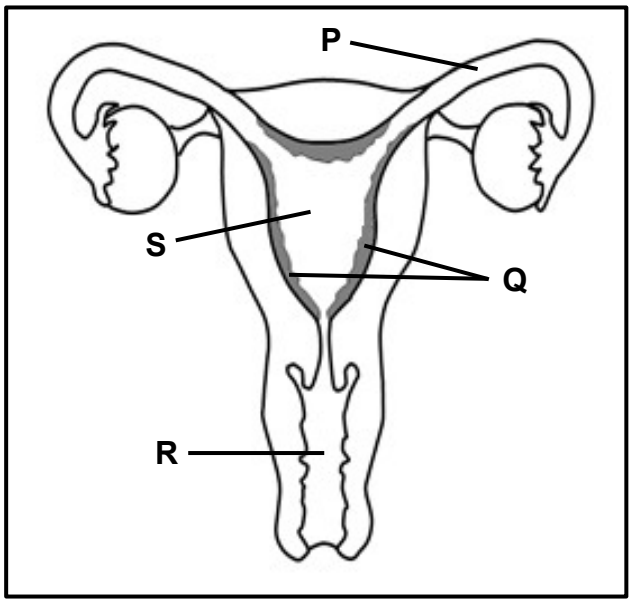
Which ONE of the following learners demonstrates the fastest response to the stimulus?

A Temisha
B Luke
C Anika
D Jordy

1.1.4 A high level of thyroxin in the blood will stimulate the …

A pituitary gland to secrete less TSH.
B thyroid gland to secrete more TSH.
C pituitary gland to secrete more TSH.
D thyroid gland to secrete more thyroxin.

QUESTIONS 1.1.5 AND 1.1.6 ARE BASED ON THE DIAGRAM OF THE FEMALE REPRODUCTIVE SYSTEM.



1.1.5 Which ONE of the following combinations is CORRECT for a normal pregnancy?

	SITE OF FERTILISATION	SITE OF IMPLANTATION
A	**P**	**S**
B	**S**	**Q**
C	**P**	**Q**
D	**R**	**P**

1.1.6 In which part does the zygote develop into a morula?

A **S**
B **Q**
C **R**
D **P**

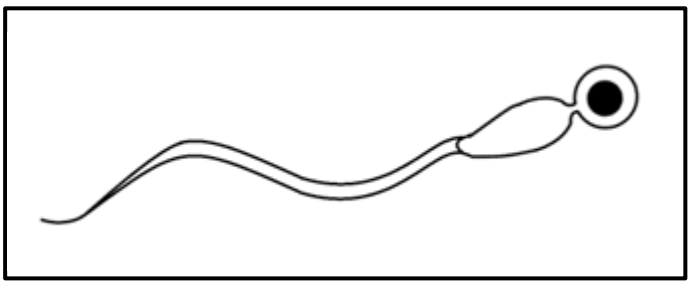
1.1.7 The following is a list of male reproductive parts:

(i) Prostate gland
(ii) Seminal vesicle
(iii) Urethra
(iv) Cowper's gland

Which ONE of the following combinations is responsible for the formation of semen?

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

1.1.8 The diagram below represents a human sperm.



This sperm is NOT structurally suitable for fertilisation because of the …

A absence of a nucleus to provide genetic material.
B absence of an acrosome to improve motility.
C presence of a long tail for the movement of the sperm.
D absence of mitochondria to provide energy.

1.1.9 The following is a list of growth responses in plants:

(i) Plants grow straight upwards
(ii) No upward growth
(iii) Increased number of lateral branches
(iv) Stems bend towards unilateral light

Which ONE of the following combinations describes the growth responses that occur when apical buds of plants are removed?

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

1.1.10 Which ONE of the following is CORRECT for a person who exercises on a hot day without taking in any liquids?

A Increased ADH secretion and increased permeability of renal tubules
B Increased ADH secretion and the production of dilute urine
C Decreased ADH secretion and increased permeability of renal tubules
D Decreased ADH secretion and the production of concentrated 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 numbers (1.2.1 to 1.2.8) in the ANSWER BOOK.

1.2.1 The ovarian hormone that is secreted by the corpus luteum

1.2.2 The eye defect that is characterised by a cloudy lens

1.2.3 The production of ova by meiosis

1.2.4 The part of the retina that contains no rods and cones

1.2.5 The release of an ovum from the ovary

1.2.6 The extra-embryonic membrane that plays a role in the formation of the placenta

1.2.7 A plant hormone responsible for seed dormancy

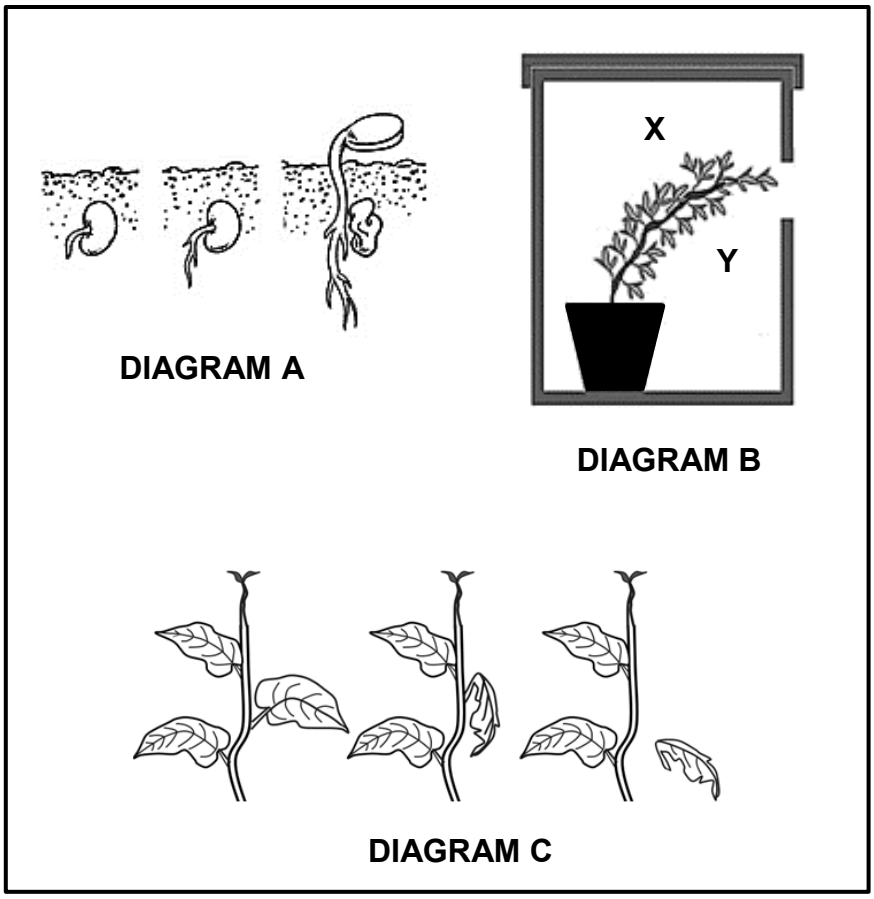
1.2.8 The maintenance of a constant internal environment within narrow limits (8 x 1) **(8)**

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	The hormone responsible for the development of secondary sexual characteristics during puberty	A: Oestrogen B: Testosterone
1.3.2	Plays a role in the pupillary mechanism	A: Ciliary muscles B: Radial muscles
1.3.3	A plant defence mechanism	A: Thorns B: Chemicals

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

1.4 The diagrams below represent different plant responses caused by hormones.



1.4.1 Give the LETTER(S) of the diagram(s) that represent a response due to:

(a) Abscisic acid (1)

(b) Auxins (2)

(c) Gibberellins (1)

1.4.2 Identify the growth response shown:

(a) By the roots in diagram **A** (1)

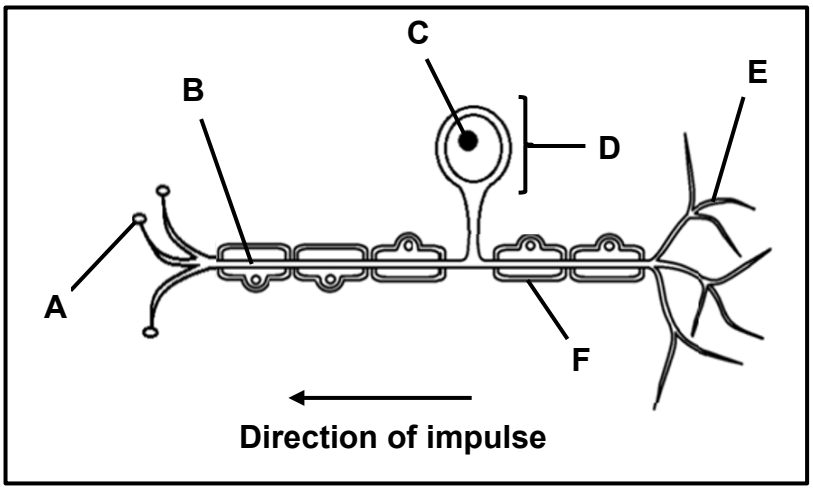
(b) In diagram **B** (1)

1.4.3 Using **X** and **Y** in diagram **B**, state which side of the stem has the highest:

(a) Concentration of auxins (1)

(b) Rate of cell division (1)
(8)

1.5 The diagram below shows the structure of a neuron.



1.5.1 Name the type of neuron represented by the diagram. (1)

1.5.2 Identify part:

(a) **B** (1)

(b) **D** (1)

(c) **E** (1)

1.5.3 Give the LETTER of the part that:

(a) Contains the genetic material of the neuron (1)

(b) Insulates the neuron (1)

(c) Makes synaptic contact with an interneuron (1)

1.5.4 Name the disorder that is associated with the degeneration of part **F**. (1)
(8)

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 In bird eggs, the yolk is the main source of energy for the developing embryo.

The table below provides information about the eggs of some bird types.

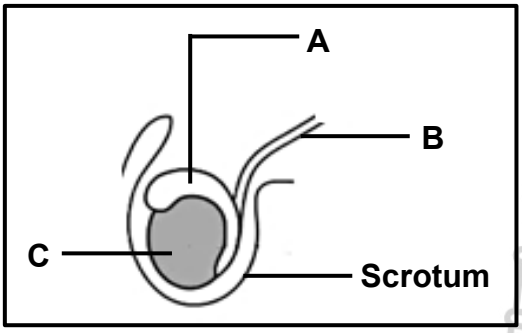
TYPE OF BIRD	AVERAGE % OF YOLK IN THE EGG
Goose	35,1
Eagle	12,0
Duck	35,4
Vulture	14,0
Chicken	31,9
Pigeon	17,9

2.1.1 Explain why we may conclude that ducks display precocial development. (3)

2.1.2 Name the THREE bird types that would have a higher degree of parental care. (3)

2.1.3 Give a reason for your answer to QUESTION 2.1.2. (2)
(8)

2.2 The diagram below shows a part of the male reproductive system.



2.2.1 Give the LETTER and the NAME of the:

(a) Gland that secretes testosterone (2)

(b) Part that stores sperm until maturation (2)

2.2.2 Explain the role of the scrotum in sperm production. (2)

2.2.3 Name and describe the process of sperm production. (5)
(11)

2.3 The thickness of the endometrium varies throughout the menstrual cycle of a female.

The table below shows the results recorded for a woman who had her endometrial thickness monitored for a particular menstrual cycle.

DAY OF THE MENSTRUAL CYCLE	THICKNESS OF THE ENDOMETRIUM (mm)
0	14
7	3
14	5
21	13
28	16

2.3.1 Referring to ovarian hormones, explain the:

(a) Decrease in thickness of the endometrium from day 0 to day 7 (3)

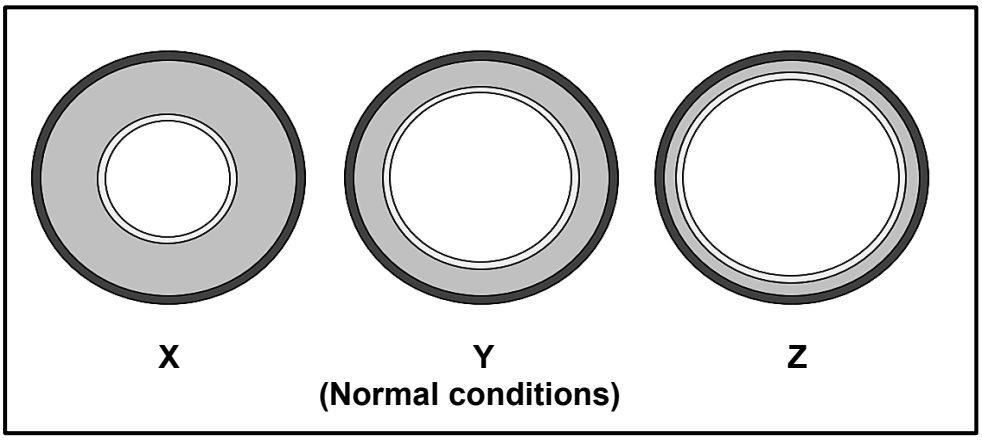
(b) Increase in thickness of the endometrium from day 7 to day 14 (2)

2.3.2 Describe changes in the endometrium that cause it to become thicker. (2)

2.3.3 State the significance of the change in endometrium thickness described in QUESTION 2.3.2. (1)

2.3.4 Draw a bar graph to show the results in the table. (6)
(14)

2.4 The diagrams below represent the differences in the diameter of an arteriole (small artery) close to the surface of the skin. These differences are due to changes that occur during thermoregulation under different environmental conditions. Diagram **Y** shows the arteriole under normal conditions.



2.4.1 Name the part of the brain that controls thermoregulation. (1)

2.4.2 Give the LETTER of the diagram which represents the arteriole on a cold day. (1)

2.4.3 Explain the significance of the change in the diameter of the arteriole from normal conditions to the condition in diagram **Z**. (4)
(6)

2.5 Idiopathic Short Stature (ISS) describes a condition where children have normal birth height, but grow slowly and do not reach the expected height for their age group. This condition is NOT due to malnutrition or different lifestyles.

Scientists investigated the effect of added growth hormone on the height of children with ISS.

The procedure was as follows:

- Consent was obtained from the parents of a group of two-year-old boys with ISS.
- The boys were divided into two groups.
- The participants in Group **A** received human growth hormone at a daily dosage of 0,028 mg per kg of body weight.
- The participants in Group **B** did not receive the hormone treatment.
- The height of the participants was measured and recorded monthly until each participant reached the age of 18 years.

At 18 years of age, the average height in Group **A** was 8 cm more than that in Group **B**.

2.5.1 State the dependent variable of this investigation. (1)

2.5.2 List THREE variables that were kept constant and which contributed to the validity of the investigation. (3)

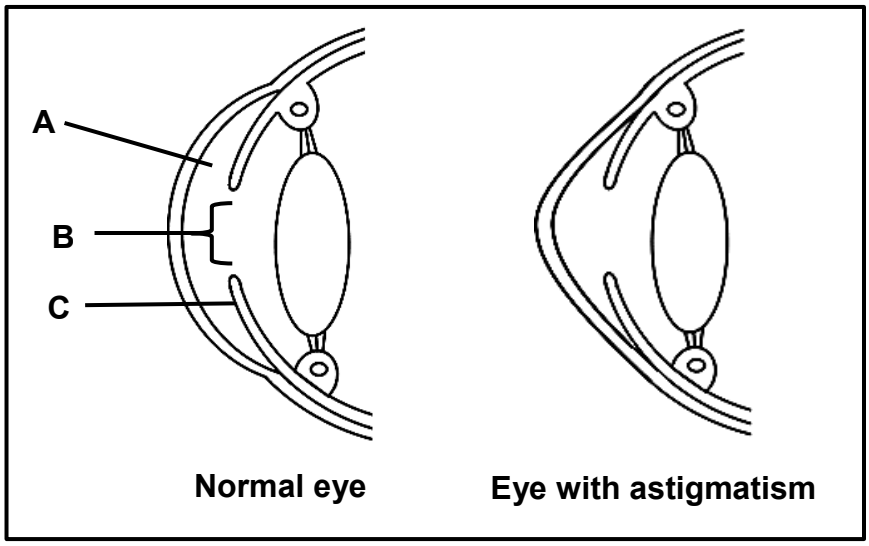
2.5.3 Explain the purpose of Group **B** in this investigation. (2)

2.5.4 Calculate the daily amount of added human growth hormone that was given to a boy with a mass of 25 kg. Show ALL your working, INCLUDING the correct unit. (3)

2.5.5 Give a conclusion for this investigation. (2)
(11)
[50]

QUESTION 3

3.1 The diagrams below represent the structure of a normal eye and that of an eye with astigmatism.



3.1.1 Identify:

(a) Fluid **A** (1)

(b) Part **B** (1)

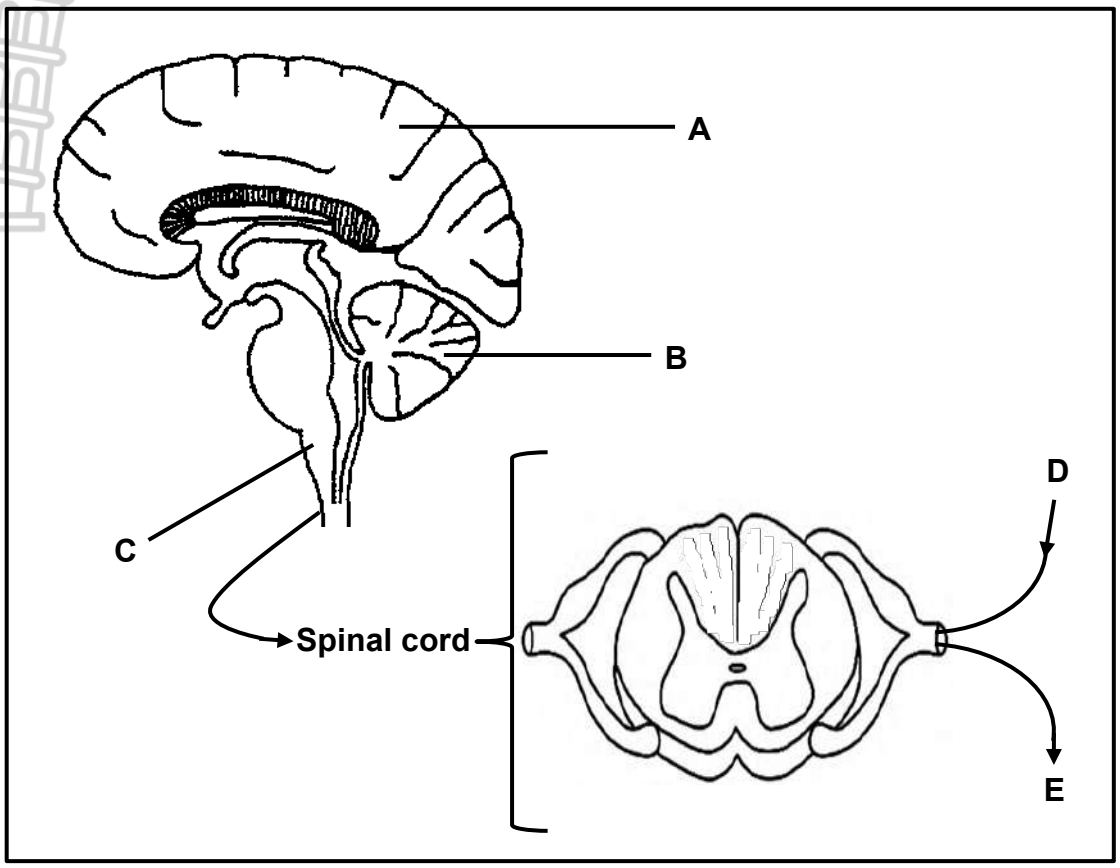
(c) Part **C** (1)

3.1.2 Describe the appearance of the cornea of an eye with astigmatism. (1)

3.1.3 Explain how astigmatism affects vision. (3)

3.1.4 Give ONE treatment for astigmatism. (1)
(8)

3.2 The diagrams below show parts of the human nervous system.



3.2.1 Name the branch of the nervous system represented by the parts shown. (1)

3.2.2 Give the LETTER and NAME of the part responsible for:

(a) Balance and coordination (2)

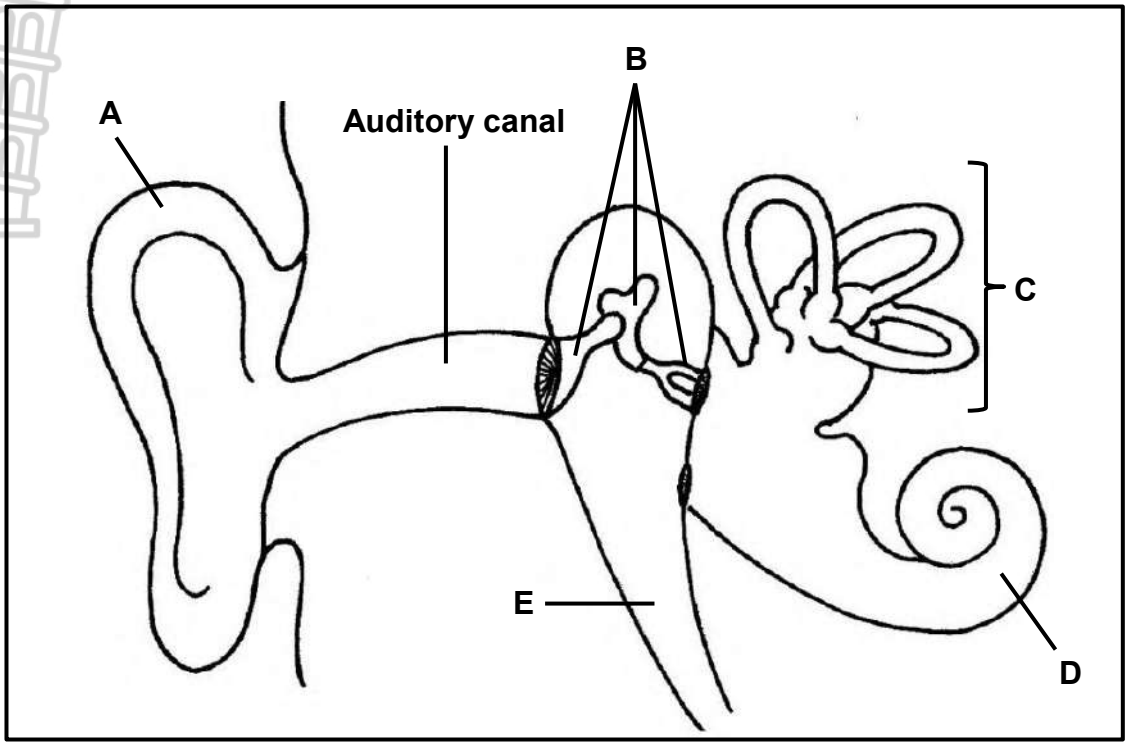
(b) Control of breathing (2)

(c) Control of skeletal muscles (2)

3.2.3 Describe the pathway of an impulse from part **D** through the spinal cord to part **E**, to bring about a reflex action. (6)
(13)

3.3 Describe how the human eye ACCOMMODATES for distant vision. **(5)**

3.4 The diagram below shows the structure of the human ear.



3.4.1 Identify part:

(a) **A** (1)

(b) **B** (1)

3.4.2 Give the LETTERS of TWO parts that are normally filled with fluid. (2)

3.4.3 Describe how balance is restored when there is a change in the speed and direction of head movement. (5)

3.4.4 When a person is exposed to loud noise over a long period, it may lead to noise-induced hearing loss (NIHL), which is caused by damage to the hair cells in the organ of Corti. These cells are not repaired when damaged. Placing earplugs in the auditory canal can prevent damage to the hair cells.

Explain how:

(a) Damage to the hair cells in the organ of Corti can lead to hearing loss (2)

(b) Earplugs can prevent damage to the hair cells in the organ of Corti (3)
(14)

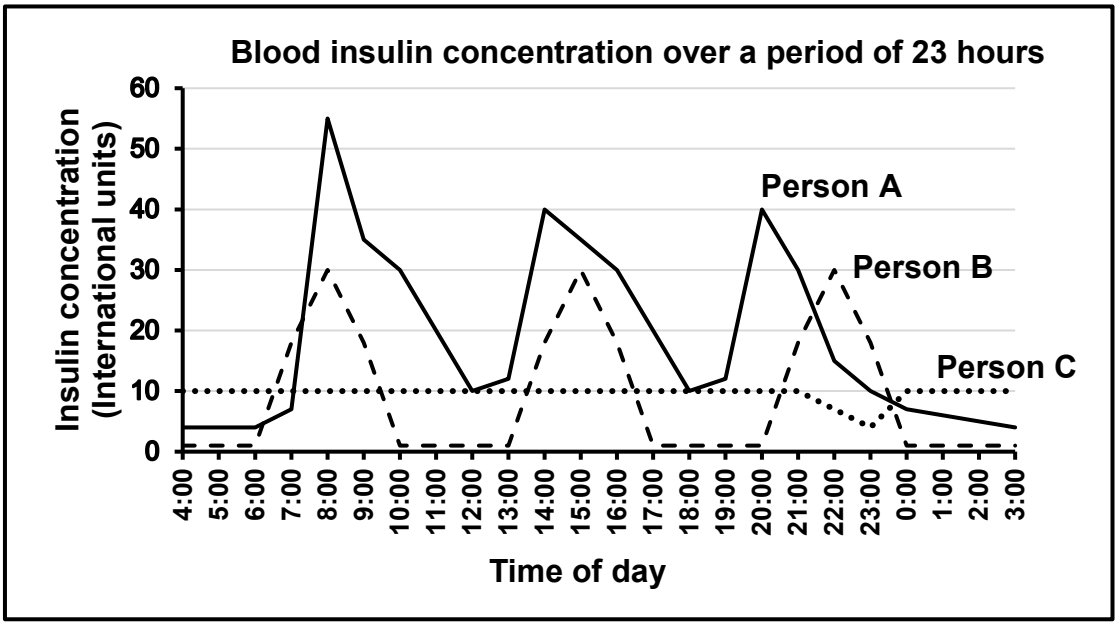
3.5 The graph below shows the insulin levels of three people over a 23-hour period, who were treated as follows:

Person A: A healthy person who received no treatment

Person B: A person with diabetes mellitus who received a rapid-acting insulin injection before each meal

Person C: A person with diabetes mellitus who received a daily injection, containing long-acting insulin, at 23:00

All three people received the same meals at the same time of the day.



3.5.1 Name the organ that secretes insulin. (1)

3.5.2 State the number of meals that were eaten during the 23-hour period. (1)

3.5.3 Tabulate TWO differences between long-acting insulin treatment and rapid-acting insulin treatment over the 23-hour period. (5)

3.5.4 Name the type of insulin treatment that is similar to insulin secretion in a healthy person. (1)

3.5.5 Explain why person **B** may experience a lack of energy after receiving a rapid-acting insulin injection if NO meal is taken. (2)

(10)
[50]

TOTAL SECTION B: 100
GRAND TOTAL: 150

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GRADE 12

LIFE SCIENCES P1

NOVEMBER 2025

MARKING GUIDELINES

MARKS: 150

These marking guidelines consist of 9 pages.

PRINCIPLES RELATED TO MARKING LIFE SCIENCES

1. **If more information than marks allocated is given**
   Stop marking when maximum marks are 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 national standardisation 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. Marking guidelines will allocate marks for units separately.

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

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 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 marking guidelines**
No changes must be made to the marking guidelines without consulting the provincial internal moderator who in turn will consult with the national internal moderator (and the Umalusi moderators where necessary).

20. **Official marking guidelines**
Only marking guidelines bearing the signatures of the national internal moderator and the Umalusi moderators and distributed by the National Department of Basic Education via the provinces must be used.

SECTION A

QUESTION 1

1.1	1.1.1	C✓✓		
	1.1.2	A✓✓		
	1.1.3	D✓✓		
	1.1.4	A✓✓		
	1.1.5	C✓✓		
	1.1.6	D✓✓		
	1.1.7	B✓✓		
	1.1.8	D✓✓		
	1.1.9	B✓✓		
	1.1.10	A✓✓	(10 x 2)	**(20)**
1.2	1.2.1	Progesterone✓		
	1.2.2	Cataracts✓		
	1.2.3	Oogenesis✓		
	1.2.4	Blind spot✓		
	1.2.5	Ovulation✓		
	1.2.6	Chorion✓		
	1.2.7	Abscisic acid✓		
	1.2.8	Homeostasis✓	(8 x 1)	**(8)**
1.3	1.3.1	Both A and B✓✓		
	1.3.2	B only✓✓		
	1.3.3	Both A and B✓✓	(3 x 2)	**(6)**
1.4	1.4.1	(a) C✓		(1)
		(b) A✓ and B✓		(2)
		(c) A✓		(1)
	1.4.2	(a) Geotropism✓/gravitropism		(1)
		(b) Phototropism✓		(1)
	1.4.3	(a) X✓		(1)
		(b) X✓		(1)
				(8)
1.5	1.5.1	Sensory✓ neuron		(1)
	1.5.2	(a) Axon✓		(1)
		(b) Cell body✓		(1)
		(c) Dendrite✓		(1)
	1.5.3	(a) C✓		(1)
		(b) F✓		(1)
		(c) A✓		(1)
	1.5.4	Multiple sclerosis✓		(1)
				(8)

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 2.1.1
- The egg has a high percentage (%) of yolk✓* therefore it
- contains more energy✓/nutrients
- The hatchling will be well developed✓ making it
- (more) independent✓ Compulsory mark✓* 1 + Any 2 (3)

2.1.2
- Eagle✓
- Vulture✓
- Pigeon✓ (3)

(Mark first THREE only)

2.1.3
- The eggs have a lower percentage (%) of yolk✓ therefore
- the hatchlings will not be fully developed✓ (2)

(8)

2.2 2.2.1
(a) C✓- Testis✓ (2)
(b) A✓- Epididymis✓ (2)

2.2.2
- It maintains the temperature of the testes/part C lower than body temperature✓
- to ensure the production of good quality/quantity of sperm✓

OR

- It protects the testes from (mechanical) injury✓ to ensure the
- production of good quality/quantity of sperm✓ (2)

2.2.3
- Spermatogenesis✓*
- Under the influence of testosterone✓
- diploid cells✓
- in the seminiferous tubules✓/testes
- undergo meiosis✓
- to form haploid (sperm) cells✓ Compulsory mark✓* 1 + Any 4 (5)

(11)

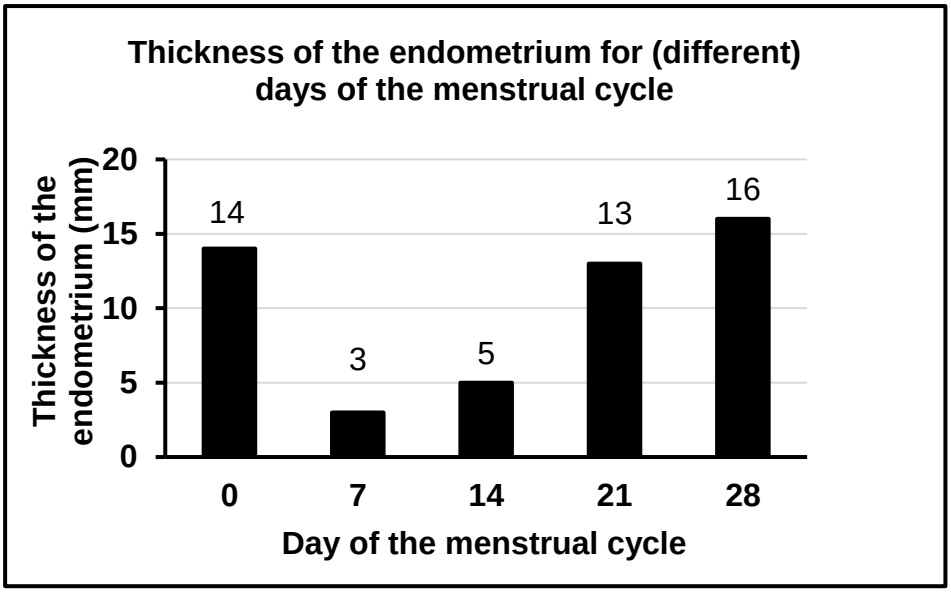
2.3 2.3.1
(a)
- The corpus luteum degenerates✓ therefore
- the progesterone levels decrease✓
- The endometrium is no longer maintained✓/menstruation occurs (3)

(b)
- the Graafian follicle✓ secretes
- oestrogen✓ which increases endometrium thickness (2)

2.3.2
- It becomes more vascular✓and
- more glandular✓ (2)

2.3.3
- It allows for implantation✓ of the embryo/the development of the placenta/increased blood supply for nutrition of the developing embryo (1)

2.3.4



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 unit for Y-axis (**L**)	1
Equal space and width of bars for X-axis and correct scale for Y-axis (**S**)	1
Plotting: (**P**) 1 - 4 co-ordinates are plotted correctly All 5 co-ordinates are plotted correctly	 1 2

(6)
(14)

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 swopped and bars are horizontal
- If labels are not corresponding, then:
  - Marks will be lost for labels and scale
  - Plotting can get credit if coordinates are correct for given labels

2.4	2.4.1	Hypothalamus✓		(1)
	2.4.2	(Diagram) X✓		(1)
	2.4.3	- The arteriole dilates✓/vasodilation took place - More blood flows to the (surface of) the skin✓ and - more heat is lost✓/more radiation occurs to - decrease/regulate the body temperature✓		(4) **(6)**
2.5	2.5.1	Height✓		(1)
	2.5.2	- Gender✓/only boys participated - All (the boys) had ISS✓ - Age✓/all (the boys) were 2-years old - Duration of investigation✓ **(Mark first THREE only)**	Any	(3)
	2.5.3	To prove that it is the added growth hormone that caused the change in the height of the boys and not any other factor✓✓		(2)
	2.5.4	(25 x 0,028)✓ = 0,7✓mg✓		(3)
	2.5.5	Added growth hormone causes an increase in height of children with ISS✓✓		(2) **(11)** **[50]**

QUESTION 3

3.1 3.1.1 (a) Aqueous humour✓ (1)

(b) Pupil✓ (1)

(c) Iris✓ (1)

3.1.2 It is not evenly curved✓/rounded (1)

3.1.3
- The light is refracted unevenly✓/in different directions and
- does not focus on the retina✓
- forming a blurred image✓ (3)

3.1.4
- Laser✓
- Surgery✓
- Glasses✓/spectacles/lenses Any (1)

(Mark first ONE only) **(8)**

3.2 3.2.1 Central nervous system✓ (1)

3.2.2 (a) B✓ - Cerebellum✓ (2)

(b) C✓ - Medulla oblongata✓ (2)

(c) A✓ - Cerebrum✓ (2)

3.2.3
- (The impulse) is transmitted by the sensory neuron✓
- via the dorsal root of the spinal nerve✓ to
- the interneuron✓ and to
- the motor neuron✓
- by synaptic✓ contact
- It is then transmitted via the ventral root (of the spinal nerve)✓
- to the effector✓ which brings about the reflex action Any (6)

(13)

3.3
- Ciliary muscles relax✓
- Suspensory ligaments become taut✓/tension on the lens increases
- The lens becomes less convex✓ causing
- light to be refracted less✓
- to form a clear image on the retina✓ **(5)**

3.4 3.4.1 (a) Pinna✓ (1)

(b) Ossicles✓ (1)

3.4.2 C✓ and D✓ (2)

(Mark first TWO only)

3.4.3
- Cristae are stimulated✓ and
- convert the stimulus to an impulse✓ which
- is sent via the auditory nerve✓
- to the cerebellum✓ for interpretation
- Impulses are then sent to the skeletal muscles✓ to restore balance (5)

3.4.4 (a)
- Fewer/no stimuli will be converted into impulses✓
- Fewer/no impulses will be sent to the cerebrum✓ to be interpreted (2)

(b)
- The earplugs limit the sound waves in the auditory canal✓/ reaching the tympanic membrane
- Fewer vibrations are formed in the middle ear✓
- Fewer pressure waves are formed in the cochlea✓ to prevent damage (3)

(14)

3.5 3.5.1 Pancreas✓ (1)

3.5.2 Three✓/nine (1)

3.5.3 ✓

LONG-ACTING INSULIN TREATMENT	RAPID-ACTING INSULIN TREATMENT
One injection✓ is given over 23 hours	Three injections✓ are given over 23 hours
The injection is given at 23:00✓	An injection is given before every meal✓
The injection causes a lower concentration of insulin✓/10 international units	The injection causes a higher concentration of insulin✓/30 international units
The concentration of insulin in the blood remains constant for long periods of time✓/20 hours	The concentration of insulin in the blood fluctuates✓/increases and drops
Long lasting effect✓	Lasts a shorter amount of time✓
Insulin concentration takes 1 hour to increase to its peak✓	Insulin concentration takes 2 hours to increase to its peak✓

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

3.5.4 Rapid-acting✓ insulin (1)

3.5.5
- The insulin will reduce the glucose level even further✓/glucose is converted to glycogen/increased glucose uptake by cells
- There is less glucose available for cellular respiration✓ (2)

(10)
[50]

TOTAL SECTION B: 100
GRAND TOTAL: 150