



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

LIFE SCIENCES P1

NOVEMBER 2023

MARKS: 150

TIME: 2½ hours

This question paper consists of 19 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–D) next to the question numbers (1.1.1 to 1.1.10) in the ANSWER BOOK, e.g. 1.1.11 D.

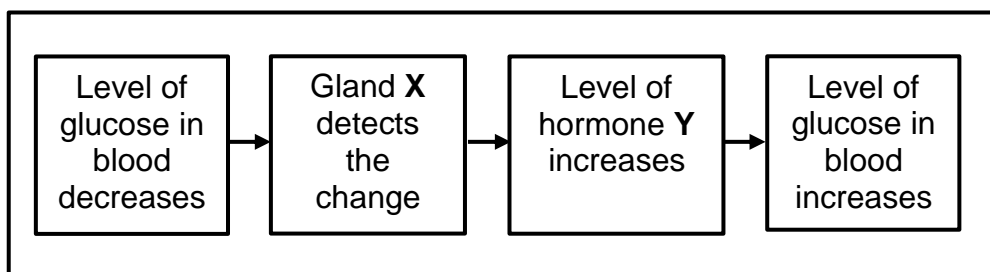
1.1.1 Which ONE of the following parts controls the amount of light entering the eye by influencing the size of the pupil?

- A Sclera
- B Cornea
- C Retina
- D Iris

1.1.2 The function of the umbilical vein is to transport ...

- A carbon dioxide from the foetus to the mother.
- B nutrients from the foetus to the mother.
- C carbon dioxide from the mother to the foetus.
- D nutrients from the mother to the foetus.

1.1.3 The diagram below represents the events that occur during the homeostatic control of blood glucose.



Which ONE of the following represents gland X and hormone Y?

	Gland X	Hormone Y
A	Pancreas	Glucagon
B	Pituitary	Glucagon
C	Pancreas	Insulin
D	Pituitary	Insulin

1.1.4 Which ONE of the following is CORRECT regarding the homeostatic control of the carbon dioxide concentration in the blood?

- A The lungs have receptors.
- B High oxygen levels is the stimulus.
- C Breathing muscles are the effectors.
- D The process is controlled by the cerebrum.

1.1.5 The plant hormones that can be used to kill broad-leaved weeds are ...

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

1.1.6 A girl looking at a car moving away from her is able to focus on the letters on the number plate.

Which ONE of the following changes occurred in her eyes?

- A The suspensory ligaments slackened.
- B The ciliary muscles relaxed.
- C Light rays were refracted more.
- D The lens became more convex.

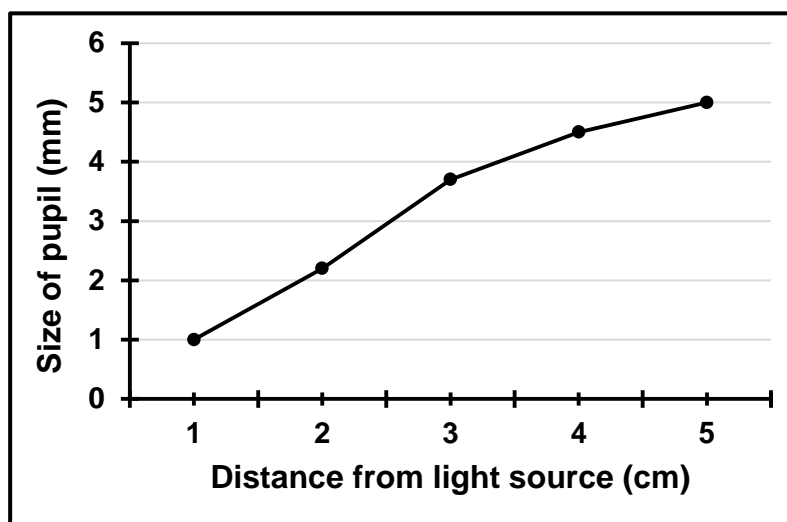
1.1.7 One of the characteristics of a sperm that causes it to move faster is the ...

- A oval-shaped head.
- B haploid nucleus.
- C presence of enzymes in the acrosome.
- D absence of a middle piece.

1.1.8 In a person suffering from long-sightedness, ...

- A the eyeball is longer than normal.
- B light rays fall behind the retina.
- C light rays are refracted more by the lens.
- D distant objects will appear blurred.

- 1.1.9 The graph below shows the results of an investigation done to determine the effect of light intensity on the size of the pupil.



Which ONE of the following statements is a conclusion that can be made from the results?

- A As the distance from the light source increases, the size of the pupil increases.
- B As the distance from the light source decreases, the size of the pupil increases.
- C As the size of the pupil increases, the distance from the light source increases.
- D As the size of the pupil decreases, the distance from the light source increases.

- 1.1.10 The following is a list of events that occur in the female body:

- (i) Puberty
- (ii) Ovulation
- (iii) Development of the corpus luteum
- (iv) Oogenesis
- (v) Thickening of the endometrium

Which ONE of the following is a combination of events that are influenced by LH (luteinising hormone)?

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

(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.

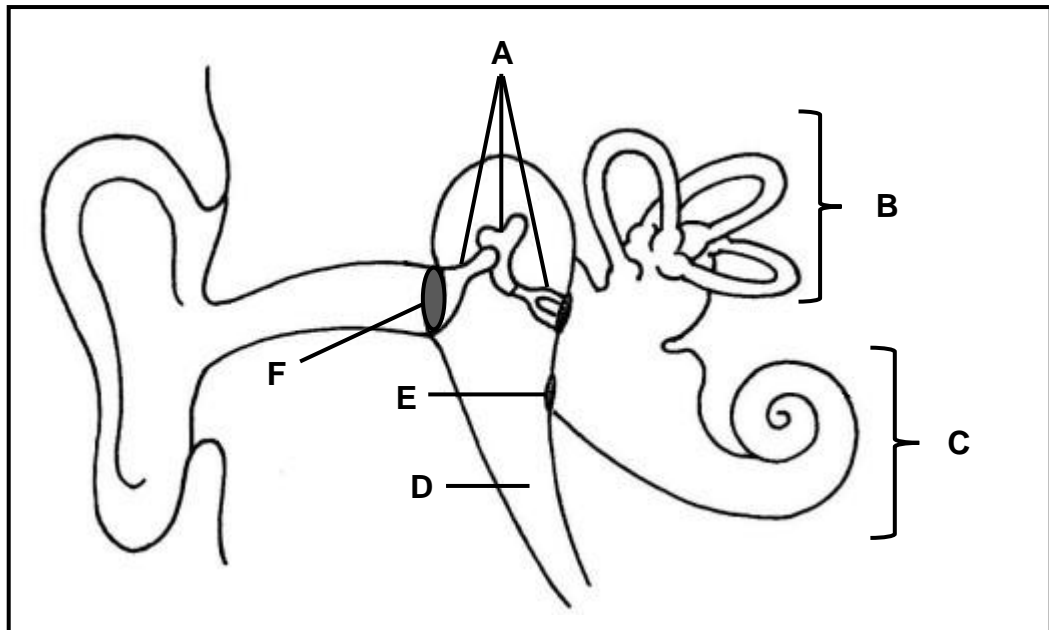
- 1.2.1 A reproductive strategy where the young receives nutrients through the placenta
- 1.2.2 The duct that transports semen and urine to the outside of the body
- 1.2.3 The part of the nervous system that consists of cranial and spinal nerves
- 1.2.4 The form in which excess glucose is stored in the liver
- 1.2.5 The structure that serves as a micro-filter during pregnancy
- 1.2.6 The pigmented layer of the eye that absorbs excess light
- 1.2.7 The part of a neuron that plays a role in the speed at which a nerve impulse is transmitted
- 1.2.8 The part of the male reproductive system which temporarily stores sperm until they mature (8 x 1) **(8)**

1.3 Indicate whether each of the descriptions in COLUMN I apply to **A ONLY**, **B ONLY**, **BOTH A AND B** or **NONE** of the items in COLUMN II. Write **A only**, **B only**, **both A and B** or **none** next to the question numbers (1.3.1 to 1.3.3) in the ANSWER BOOK.

COLUMN I		COLUMN II
1.3.1	A process that produces four mature gametes in humans from a single diploid cell	A: Oogenesis B: Spermatogenesis
1.3.2	A defence mechanism that protects plants against herbivores	A: Thorns B: Chemicals
1.3.3	The nerve that transmits impulses from the retina to the brain	A: Optic nerve B: Auditory nerve

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

1.4 The diagram below represents the human ear.



1.4.1 Identify part:

(a) **B** (1)

(b) **E** (1)

1.4.2 Give the LETTER and NAME of the part that:

(a) Is filled with air (2)

(b) Contains the organ of Corti (2)

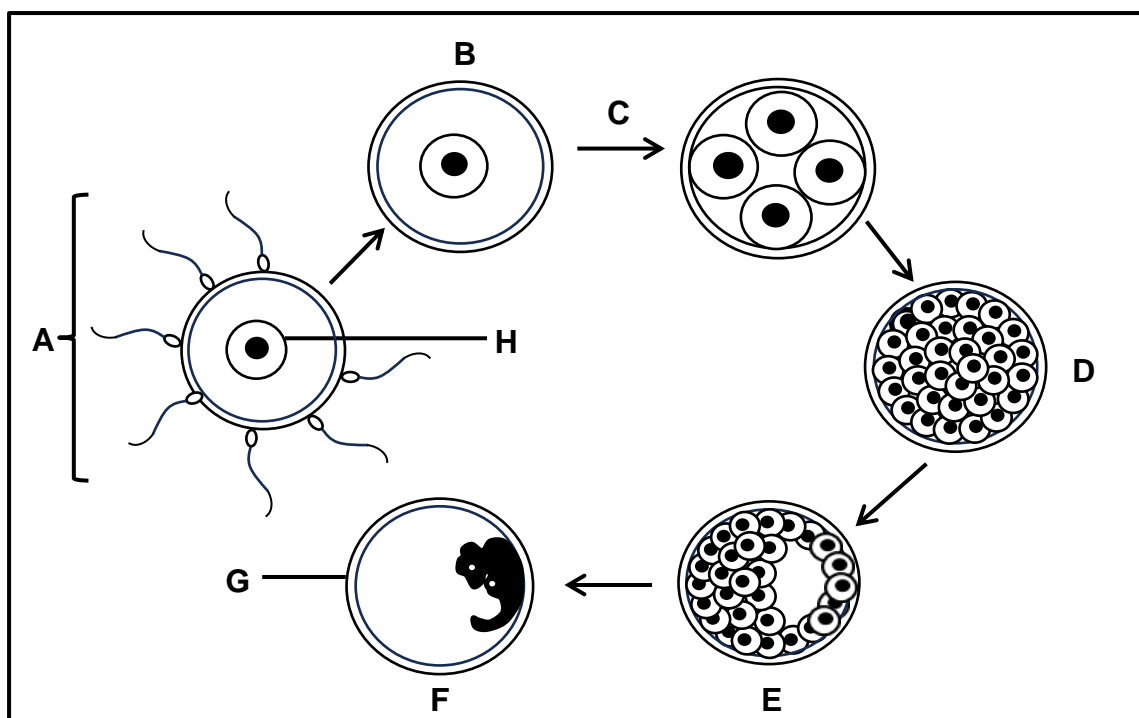
1.4.3 Give the LETTER of the part:

(a) Where grommets are inserted (1)

(b) That amplifies vibrations (1)

(8)

- 1.5 The diagram below shows events that may take place inside a human female body.



- 1.5.1 Identify structure:

- (a) **B** (1)
 (b) **D** (1)
 (c) **E** (1)

- 1.5.2 Name the:

- (a) Process taking place at **A** (1)
 (b) Inner wall of the uterus where structure **E** implants (1)

- 1.5.3 State the type of cell division that takes place at **C**. (1)

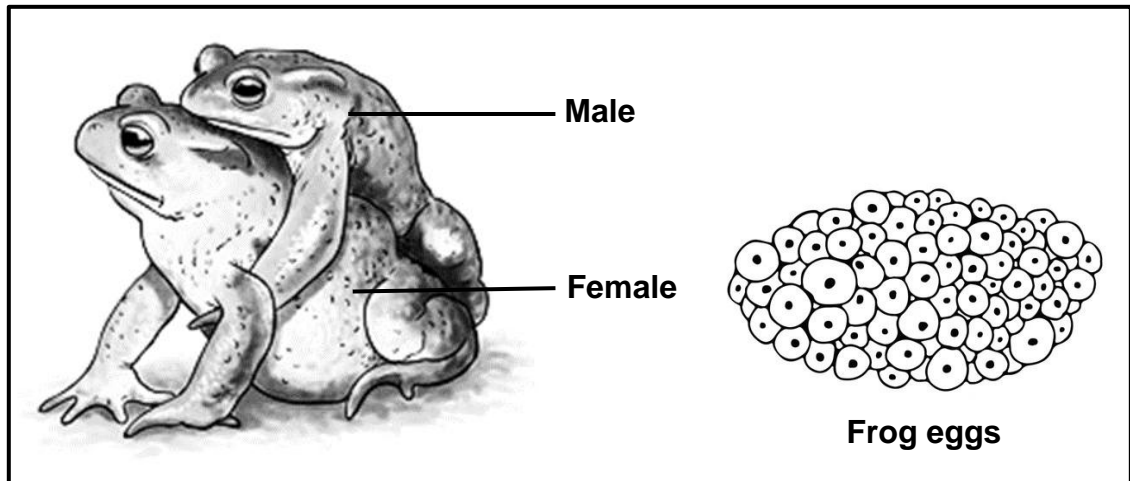
- 1.5.4 How many chromosomes are normally found in **H**? (1)

- 1.5.5 Identify the extra-embryonic membrane **G**. (1)
(8)

TOTAL SECTION A: 50

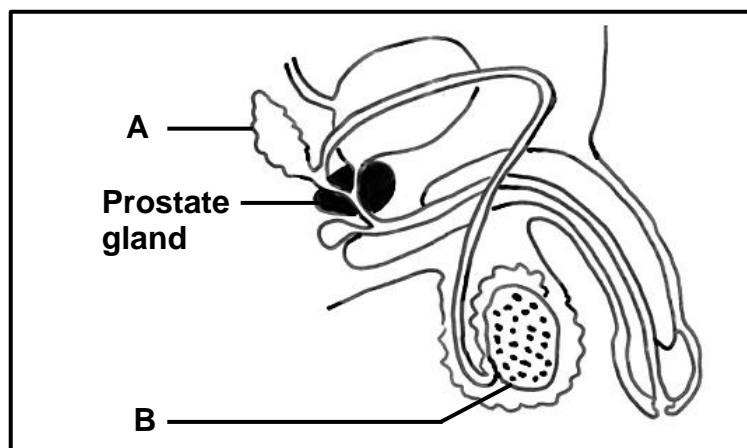
SECTION B**QUESTION 2**

- 2.1 In some frog species, during mating, the male climbs onto the back of the female and grasps her with his front legs. During this time, the female will release about 6 000 ova, while the male releases sperm onto them. This mating behaviour is called amplexus.



- 2.1.1 Name the type of fertilisation that occurs during reproduction in frogs. (1)
- 2.1.2 Explain why the fertilised eggs of these frogs do not survive on land. (2)
- 2.1.3 Explain how amplexus increases the chances of fertilisation in frogs. (2)
- 2.1.4 From the information above, explain ONE other strategy that contributes to the reproductive success of the frog species. (2)
- (7)**

2.2 The diagram below represents the male reproductive system.



2.2.1 Name:

- (a) Part **A** (1)
- (b) The hormone secreted by **B** (1)

2.2.2 Explain ONE function of the fluid secreted by the prostate gland during reproduction. (2)

2.2.3 Prostate cancer is one of the most common types of cancer among men.

The table below shows the number of men per 100 000 men of different age groups that were diagnosed with prostate cancer in a certain country over a period of 14 years.

AGE GROUP	NUMBER OF PROSTATE CANCER CASES (PER 100 000 MEN)
<49	5
50–54	135
55–59	288
60–64	488
65–69	720
70–74	764
75–79	693
>80	473

- (a) According to the table, which age group of men is most likely to develop prostate cancer? (1)
- (b) Draw a histogram to represent the data for men from the age group 60–64 to the age group 75–79. (6)
- (11)

2.3 Read the extract below.

OVARIAN CYSTS IN FEMALES

Ovarian cysts are fluid-filled structures that develop inside the ovaries of some women. The two most common types of cysts in women of reproductive age are follicular cysts and corpus luteum cysts.

Follicular cysts develop when a Graafian follicle fails to rupture and release the ovum. The follicle continues to grow because of continued hormonal stimulation.

A corpus luteum cyst develops when the corpus luteum does not degenerate, even when a person is not pregnant.

Women often show no symptoms and the cysts disappear, but in rare cases ovarian cysts keep on increasing in size. A very large cyst can cause intense pain and may rupture, leading to internal bleeding. Such cysts will require surgical removal.

2.3.1 From the extract, give:

- (a) TWO structures in the ovary that may develop into cysts (2)
- (b) TWO symptoms associated with very large cysts (2)

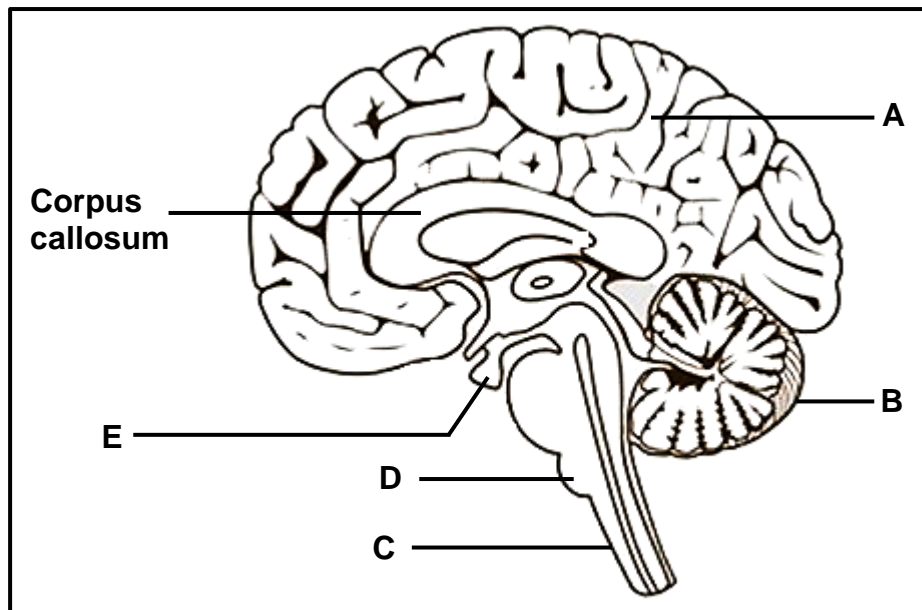
2.3.2 Name the hormone:

- (a) Responsible for the growth of the follicle under normal conditions (1)
- (b) That will be high in concentration in the blood of women where follicular cysts develop (1)

2.3.3 Give a reason for your answer to QUESTION 2.3.2(b). (1)

2.3.4 Explain why a woman will not be able to fall pregnant if she has a corpus luteum cyst that does not disappear. (5)
(12)

2.4 The diagram below represents part of the central nervous system of a human.



2.4.1 Identify:

- (a) Part **C** (1)
- (b) Gland **E** (1)

2.4.2 Give the LETTER of the part that controls voluntary actions. (1)

2.4.3 Describe the location of the corpus callosum. (2)

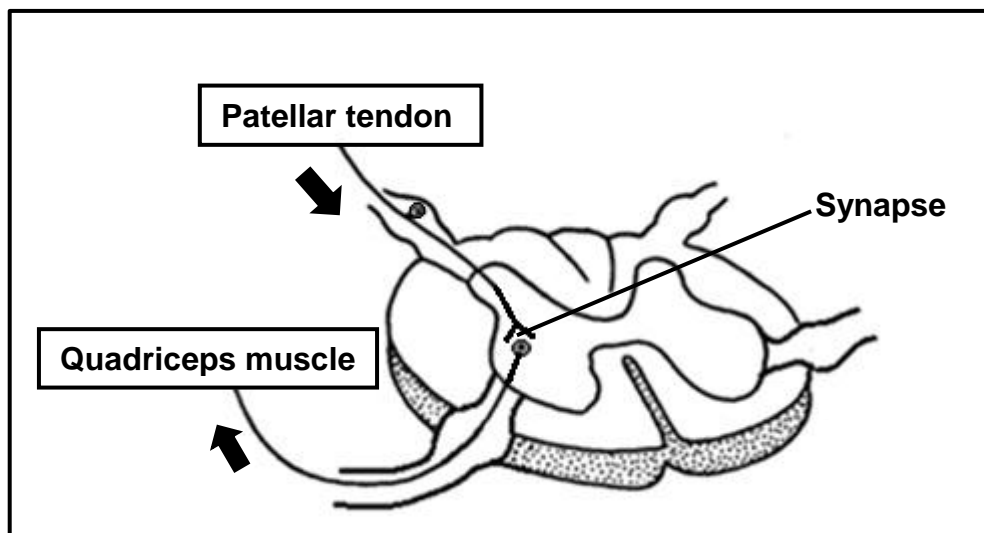
2.4.4 A learner suffered a brain injury during a rugby match. He could still breathe properly but he experienced occasional loss of memory and balance.

Explain why:

- (a) The learner could still breathe properly (2)
 - (b) It is possible that the injury affected part **B** (2)
 - (c) The hearing of the learner could also be affected because of the injury (2)
- (11)

- 2.5 The efficiency and speed of the knee-jerk reaction is very important for balance and movement. The stimulation of the patellar tendon, just below the knee cap (patella), causes the contraction and relaxation of the quadriceps muscle in the upper leg.

The diagram below represents the reflex arc for the knee-jerk reaction containing only ONE synapse. The arrows indicate the transmission of nerve impulses.



- 2.5.1 What is a *reflex action*? (2)
- 2.5.2 State: (1)
- (a) ONE reason why a synapse is significant (1)
- (b) The importance of the knee-jerk reaction (1)
- 2.5.3 Describe the pathway of the impulse in this reflex arc to bring about the knee-jerk reaction. (5)
- (9)
- [50]

QUESTION 3

3.1 Read the extract below.

ALZHEIMER'S DISEASE AND EXERCISE

Age and family history are the known risk factors for Alzheimer's disease. The most common symptom of Alzheimer's disease is a worsening ability to remember new information.

Regular exercise may help to reduce the risk of developing Alzheimer's disease because it can improve blood flow to the brain and help to maintain the volume of the hippocampus. The hippocampus is located deep inside the cerebrum and plays a major role in learning ability and orientation.

Scientists conducted an investigation to determine if regular exercise reduces the risk of Alzheimer's disease in humans.

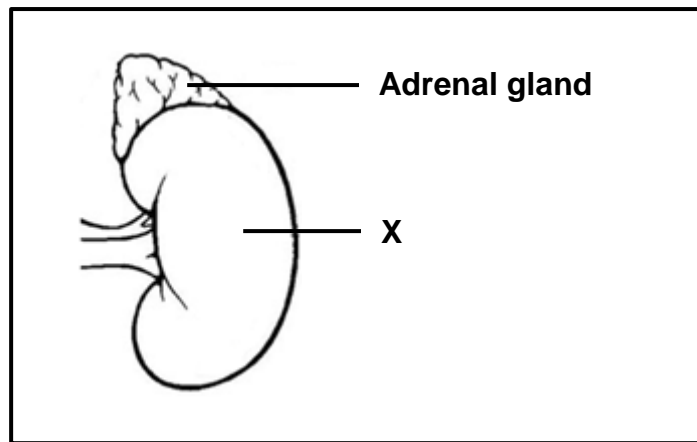
They:

- Used 37 female participants between the ages of 65 and 75 in an exercise programme
- Used participants that did not show symptoms of Alzheimer's disease at the start of the investigation
- Conducted the investigation three times a week for three months

The results showed an improvement in higher-order thinking abilities and an increased blood flow to the cerebrum.

- 3.1.1 State ONE change in the nerve tissue of the brain that can cause Alzheimer's disease. (1)
- 3.1.2 From the extract, state: (1)
- (a) ONE symptom of Alzheimer's disease (1)
- (b) A genetic risk factor (1)
- (c) TWO functions of the hippocampus (2)
- 3.1.3 Name TWO factors that were considered when selecting the participants for this investigation. (2)
- 3.1.4 State TWO ways in which the scientists improved the reliability of their results. (2)
- 3.1.5 Explain why this investigation cannot be used to conclude that exercise reduces the risk of getting Alzheimer's disease. (2)
- 3.1.6 From the extract, explain why it is expected that regular exercise can reduce the risk of Alzheimer's disease. (3)
- (14)**

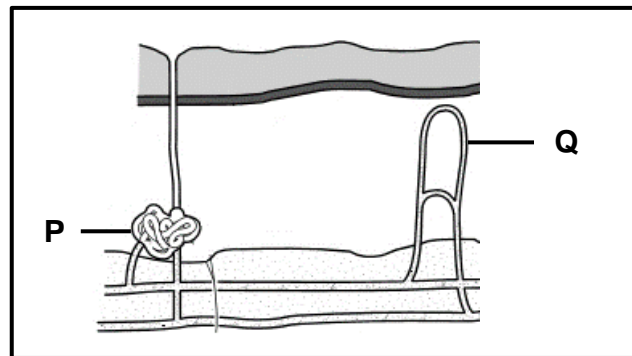
- 3.2 The diagram below shows the location of the adrenal gland in the human body.



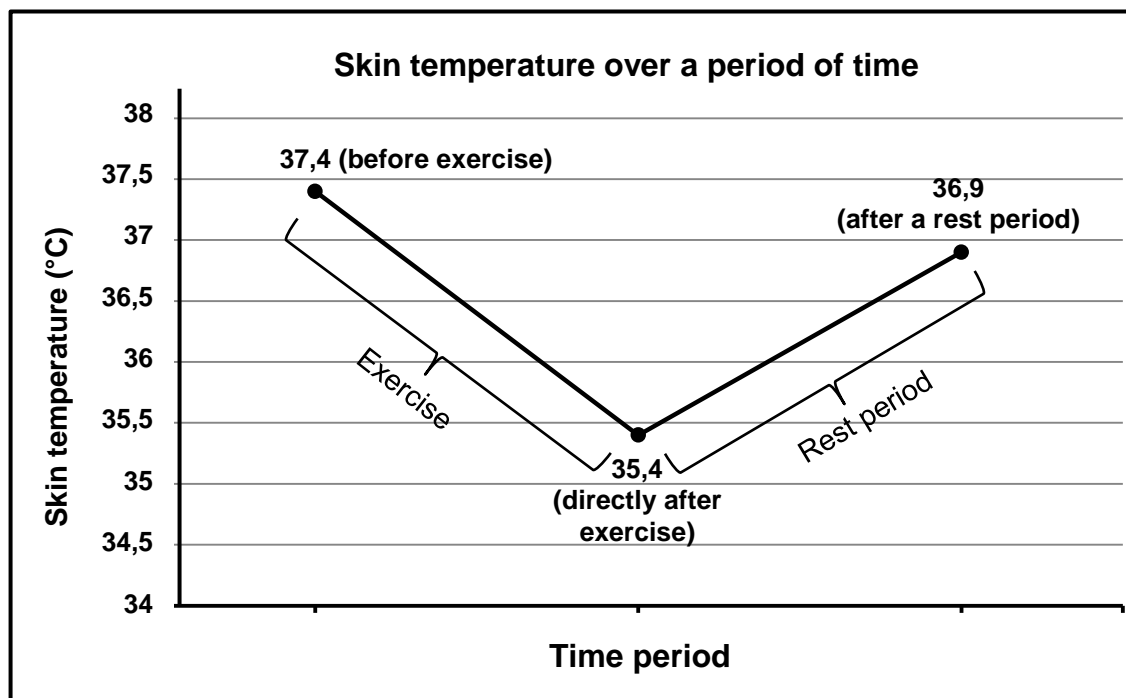
- 3.2.1 Identify:
- (a) Organ **X** (1)
 - (b) The system to which the adrenal gland belongs (1)
- 3.2.2 State TWO characteristics of the type of glands that belongs to the system identified in QUESTION 3.2.1(b). (2)
- 3.2.3 Describe the interaction between the adrenal gland and organ **X** in maintaining homeostasis when salt levels in the blood are low. (5)
- 3.2.4 Explain the effect that a secretion of the pituitary gland will have on organ **X** when a person experiences dehydration. (5)
- (14)**

- 3.3 A twelve-year-old boy participated in physical exercise for 45 minutes, followed by a 15-minute rest period. The skin temperature of the boy was measured and the results were recorded.

The diagram below represents the skin of the boy before exercise.



The graph below shows the changes in skin temperature over a period of time.



3.3.1 Name the:

- (a) Homeostatic mechanism that brings about the change in skin temperature (1)
- (b) Part of the brain that is responsible for the mechanism named in QUESTION 3.3.1(a) (1)

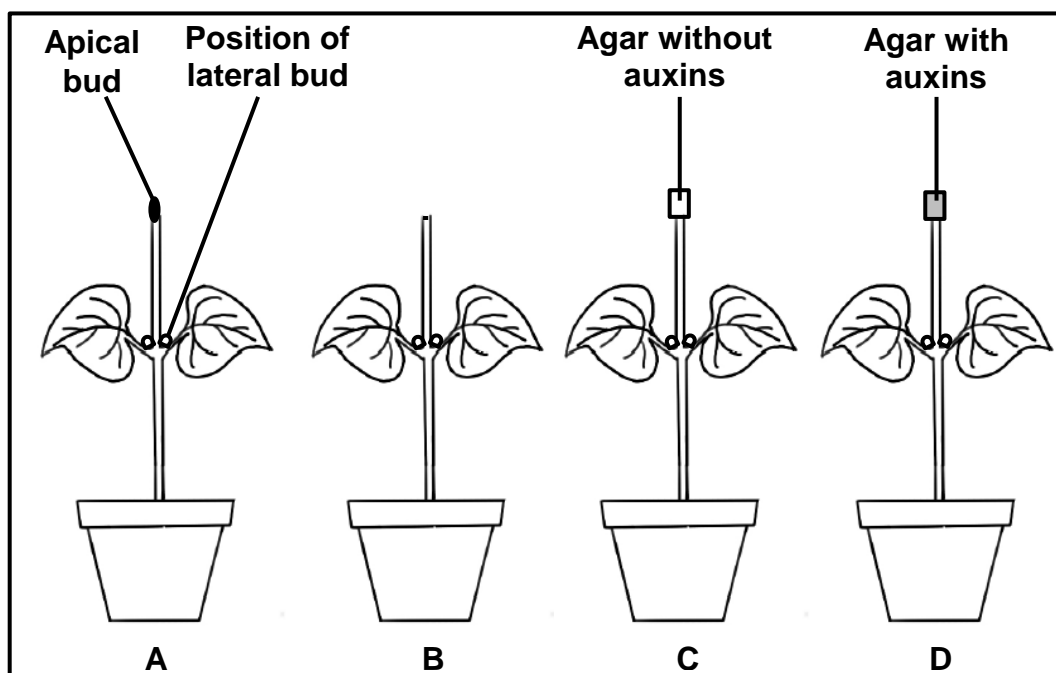
- 3.3.2 From the diagram, identify the following parts:
- (a) **P** (1)
- (b) **Q** (1)
- 3.3.3 Calculate the percentage decrease in the average skin temperature of the boy before and directly after exercise. Show ALL working. (3)
- 3.3.4 Explain the roles of part **P** and **Q** in the change in skin temperature from before exercise to directly after exercise. (6)
- (13)**

- 3.4 An investigation was done to determine the effect of auxins on the growth of lateral branches. (The elongation of lateral buds results in the growth of lateral branches.)

The procedure was as follows:

- Four potted plants (**A**, **B**, **C** and **D**) of the same species were used.
- Plant **A** was left untreated.
- The apical bud of plant **B** was removed.
- The apical bud of plant **C** was removed and replaced with agar jelly (a jelly-like substance through which other substances can diffuse).
- The apical bud of plant **D** was removed and replaced with agar jelly containing auxins.
- The plants were exposed to the same environmental conditions.
- The length of the lateral buds of each plant was measured at the beginning of the investigation and again after three weeks.

The diagram below shows the setup of the investigation at the beginning.



The results are shown in the table below.

Plant	Length of the lateral buds (mm)	
	At the beginning	After three weeks
A	7,0	7,3
B	6,9	10,4
C	7,2	10,3
D	7,1	7,2

3.4.1 For this investigation, state the:

- (a) Independent variable (1)
- (b) Dependent variable (1)

3.4.2	Explain why all the plants were exposed to the same environmental conditions.	(2)
3.4.3	Explain why agar without auxins was used in plant C .	(3)
3.4.4	State a conclusion for this investigation.	(2)
		(9)
		[50]
	TOTAL SECTION B:	100
	GRAND TOTAL:	150



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NATIONAL SENIOR CERTIFICATE

GRADE 12

LIFE SCIENCES P1

NOVEMBER 2023

MARKING GUIDELINES

MARKS: 150

These marking guidelines consist of 10 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 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. Memorandum 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 memorandum**
No changes must be made to the memoranda without consulting the provincial internal moderator who in turn will consult with the national internal moderator (and the Umalusi moderators where necessary).
20. **Official memoranda**
Only memoranda 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	D✓✓		
	1.1.2	D✓✓		
	1.1.3	A✓✓		
	1.1.4	C✓✓		
	1.1.5	C✓✓		
	1.1.6	B✓✓		
	1.1.7	A✓✓		
	1.1.8	B✓✓		
	1.1.9	A✓✓		
	1.1.10	C✓✓	(10 x 2)	(20)
1.2	1.2.1	Vivipary✓		
	1.2.2	Urethra✓		
	1.2.3	Peripheral✓ nervous system		
	1.2.4	Glycogen✓		
	1.2.5	Placenta✓		
	1.2.6	Choroid✓		
	1.2.7	Myelin sheath✓		
	1.2.8	Epididymis✓	(8 x 1)	(8)
1.3	1.3.1	B only✓✓		
	1.3.2	Both A and B✓✓		
	1.3.3	A only✓✓	(3 x 2)	(6)
1.4	1.4.1	(a) Semi-circular canals✓		(1)
		(b) Round window✓		(1)
	1.4.2	(a) D✓ Eustachian tube✓		(2)
		(b) C✓ Cochlea✓		(2)
	1.4.3	(a) F✓		(1)
		(b) A✓		(1)
1.5	1.5.1	(a) Zygote✓		(1)
		(b) Morula✓		(1)
		(c) Blastocyst✓/blastula		(1)
	1.5.2	(a) Fertilisation✓		(1)
		(b) Endometrium✓		(1)
	1.5.3	Mitosis✓		(1)
	1.5.4	23✓		(1)
	1.5.5	Chorion✓		(1)
				(8)

TOTAL SECTION A: 50

SECTION B**QUESTION 2**

2.1 2.1.1 External✓ fertilisation (1)

2.1.2 - The eggs will dry out✓
 - because they have no shells✓/are not amniotic eggs /have no amnion (2)

2.1.3 - The male and female bodies are in close contact✓
 so that sperm can be released directly onto the ova✓

OR

- Many/up to 6 000 ova are released✓
 since fertilisation is external✓ Any (1 x 2) (2)
(Mark the first ONE only)

2.1.4 - Many/up to 6 000 ova are released✓
 since fertilisation is external✓/increasing the chance that some will be fertilised

OR

- The male and female bodies are in close contact✓
 so that sperm can be released directly onto the ova✓
(Mark the first ONE only) Any (1 x 2) (2)
(7)

2.2 2.2.1 (a) Seminal vesicle✓ (1)

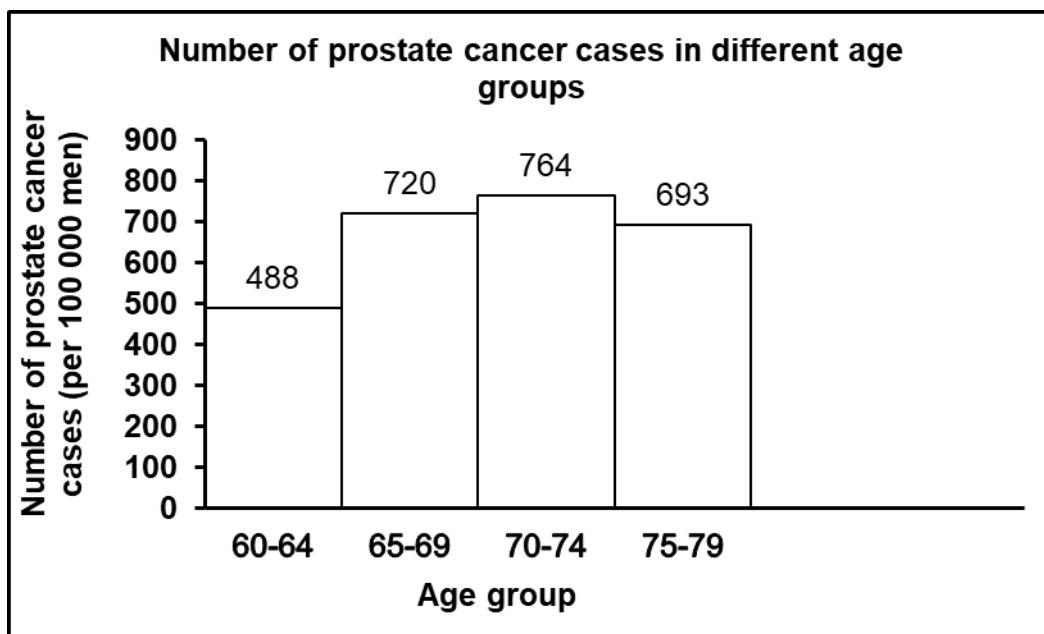
(b) Testosterone✓ (1)

2.2.2 - It is alkaline✓
 to neutralise the acidic conditions of the vagina✓
 - It contains mucus✓/provides medium
 to facilitates the movement of the sperm✓
 - It contains nutrients✓
 to supply the sperm with energy✓ Any (1 x 2) (2)
(Mark first ONE only)

2.2.3 (a) (70 – 74) ✓

(1)

(b)

**Criteria for marking of the graph:**

Criteria	Mark allocation
Histogram is drawn (T)	1
Caption of the graph includes both variables (C)	1
Correct labels on the X-axis and Y-axis with correct unit on the Y-axis (L)	1
Correct scale for Y-axis and bars of equal width with no spaces for X-axis (S)	1
Plotting (P) correctly done for: 1- 3 age groups	1
All 4 required age groups only	2

(6)
(11)

If a bar graph 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 coordinates are correct for given labels

2.3

2.3.1

- (a) - (Graafian) follicle✓ and
- Corpus luteum✓
(Mark first TWO only)

(2)

- (b) - (Intense) pain✓
- Internal bleeding✓
(Mark first TWO only)

(2)

2.3.2	(a) FSH✓		(1)
	(b) Oestrogen✓		
		OR	
	LH✓		
		OR	
	FSH✓		(1)
2.3.3	The Graafian follicle keeps on producing oestrogen✓/fails to rupture		
		OR	
	The increased secretion of oestrogen stimulates the secretion of LH✓		
		OR	
	Excess production of FSH can cause the failure to ovulate✓/ Graafian follicle to rupture		(1)
2.3.4	<ul style="list-style-type: none">- The corpus luteum does not degenerate✓and- keeps on secreting progesterone✓- This will inhibit the pituitary gland✓- from secreting FSH✓- Therefore no follicle will develop✓ and- no ovulation✓ will take place	Any	(5) (12)
2.4	2.4.1	(a) Spinal cord✓	(1)
		(b) Pituitary gland✓/hypophysis	(1)
	2.4.2	A✓	(1)
	2.4.3	Between the two hemispheres of the cerebrum✓✓	(2)
	2.4.4	(a) <ul style="list-style-type: none">- Part D/ medulla oblongata which controls breathing✓- was not injured✓	(2)
		(b) <ul style="list-style-type: none">- The learner (occasionally) lost balance✓- due to no coordination of voluntary movements✓ by part B	(2)
		(c) <ul style="list-style-type: none">- The loss of memory indicates a possible injury to part A✓/the cerebrum- which is also responsible for hearing ✓/ (interpretation of) sound	(2) (11)
2.5	2.5.1	<ul style="list-style-type: none">- A rapid involuntary/automatic response✓- to a stimulus✓	(2)
	2.5.2	(a) It ensures that the impulse is transmitted in one direction✓ (Mark first ONE only)	(1)
		(b) It is important for balance✓/movement	(1)

- 2.5.3
- The impulse is transmitted from the receptors in the patellar tendon✓ through the
 - sensory neuron✓ and the
 - synapse✓ to the
 - motor neuron✓ and to the
 - quadriceps✓ muscle
- (Correct sequence is required)**
- (5)
(9)
[50]

QUESTION 3

- 3.1 3.1.1 - Degeneration✓/wasting away of nerve tissue
- Plaque/proteins formed around the nerve tissue✓ Any (1)
(Mark first ONE only)
- 3.1.2 (a) Worsening ability to remember new information✓ (1)
(Mark first ONE only)
- (b) Family history✓ (1)
- (c) - Learning ability✓
 - Orientation✓ (2)
(Mark first TWO only)
- 3.1.3 They:
- Were all females✓/considered gender
- Were between the ages of 65 and 75✓/considered age group/age
- Did not show symptoms of Alzheimer's disease✓ Any (2)
(Mark first TWO only)
- 3.1.4 They:
- Used 37 participants✓
- Conducted the investigation three times a week✓
- Conducted the investigation for three months✓ Any (2)
(Mark first TWO only)
- 3.1.5 - Investigation did not establish the relationship between exercise and development of Alzheimer's disease✓
- since no changes in the nervous tissue were measured✓/period was short
- OR**
- There was no control group✓
 - to show that it is the exercise that improve blood flow✓/higher order-thinking abilities
- OR**
- People who did not show symptoms of Alzheimer's disease were used✓
 - therefore, results do not show prevention of development of Alzheimer's disease✓ Any (1 x 2) (2)

	3.1.6	<ul style="list-style-type: none"> - Exercise can improve blood flow to the brain✓ and - it can maintain the volume of the hippocampus✓ which will - prevent a decrease in higher order thinking✓/cognitive abilities/learning abilities 	(3) (14)
3.2	3.2.1	(a) Kidney✓ (b) Endocrine✓ system	(1) (1)
	3.2.2	<ul style="list-style-type: none"> - It releases hormones✓ - directly into the blood✓/and it is ductless (Mark first TWO only)	(2)
	3.2.3	<ul style="list-style-type: none"> - Low salt levels are detected by receptor cells✓ in the kidney - Adrenal glands are stimulated✓ to secrete - more aldosterone✓ - which stimulates the renal tubules✓ - to be more permeable to salt✓ - This increases the reabsorption of salt✓ and - the salt levels in the blood increase✓/return back to normal 	Any (5)
	3.2.4	<ul style="list-style-type: none"> - The secretion of ADH✓ - will increase✓ - which will increase the permeability✓ - of the renal tubules✓ in X - so that more water is reabsorbed✓ from the filtrate 	(5) (14)
3.3	3.3.1	(a) Thermoregulation✓ (b) Hypothalamus✓	(1) (1)
	3.3.2	(a) Sweat gland✓ (b) Capillary✓/blood vessel	(1) (1)
	3.3.3	$\frac{(37,4 - 35,4)}{37,4} \times 100 = 5,35\%$	(3)
	3.3.4	<ul style="list-style-type: none"> - Skin temperature decreased✓/lowers from 37,4 °C to 35,4 °C - because part Q dilated✓/vasodilated - causing more blood to flow to the (surface of the) skin✓ and - part P became (more) active✓/produced more sweat - causing more heat to be lost✓ to the environment - through evaporation✓/ radiation/ convection 	(6) (13)

3.4	3.4.1	(a) (Presence/absence of) auxins✓	(1)
		(b) Growth of lateral branches✓	(1)
	3.4.2	- To ensure that the results are caused only by the presence of auxins✓ which - increases the validity✓ of the investigation	(2)
	3.4.3	- It acts as a control✓ - to show that the results of Plant D ✓ - are caused by the (presence of) auxins✓ - and not the agar jelly✓	Any (3)
	3.4.4	The presence of auxins slows down the growth of lateral branches✓✓	
		OR	
		The absence of auxins stimulated the growth of lateral branches✓✓	(2)
			(9)
			[50]
		TOTAL SECTION B:	100
		GRAND TOTAL:	150