

EXAMINATION		NATIONAL SENIOR CERTIFICATE
GRADE		12
DATE		MAY/JUNE 2026
SUBJECT		LIFE SCIENCES
PAPER		1
MARK TOTAL		150
DURATION (HOURS)		2½
NUMBER OF PAGES		17



SOUTH AFRICAN COMPREHENSIVE ASSESSMENT INSTITUTE
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INSTRUCTIONS AND INFORMATION

1. Answer **ALL** the questions.
2. Write **ALL** the answers in the **ANSWER BOOK**.
3. Start the answer to each question at the top of a **NEW** page.
4. Number the answers exactly as the questions are numbered.
5. Present your answers according to the instructions of each question.
6. **ALL** drawings should be done in pencil and labelled in ink.
7. Only draw diagrams and flow charts when requested to do so.
8. The diagrams in the question paper may **NOT** necessarily be drawn to scale.
9. The use of graph paper is **NOT** permitted.
10. A non-programmable calculator, protractor and a compass may be used.
11. Write neatly and legibly, in **BLUE** ink only.



SECTION A

QUESTION 1

1.1 Various options are provided as possible answers to the following questions. Choose the correct answer and write only the letter (A–D) next to the question numbers (1.1.1 to 1.1.9) in the ANSWER BOOK, for example **1.1.10 D**.

1.1.1 A substance that will cause the liver to release glucose is:

- A Bile
- B Glucagon
- C Glycogen
- D Insulin

1.1.2 Ovulation during pregnancy is prevented by high levels of:

- A FSH
- B LH
- C TSH
- D Progesterone

1.1.3 The stage in the development of the human embryo, consisting of a ball of cells, is called the:

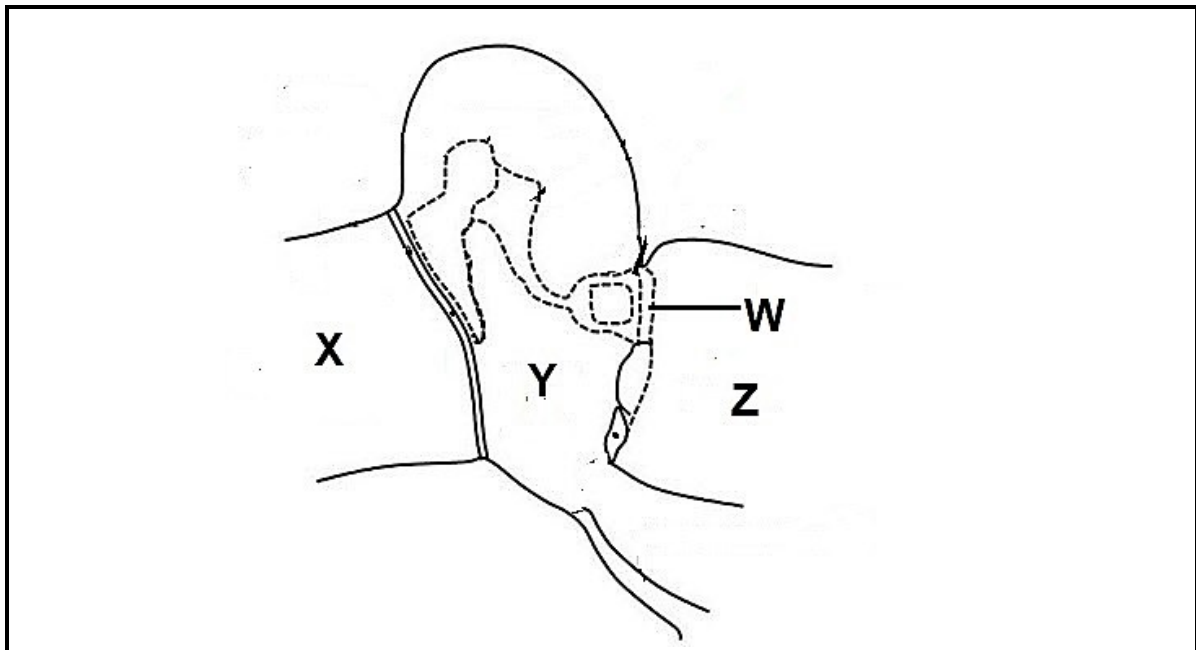
- A Zygote
- B Follicle
- C Blastocyst
- D Morula

1.1.4 The centre of the yellow spot of the eye contains:

- A Only cones
- B More rods than cones
- C Cones and rods in equal numbers
- D Rods only



Questions 1.1.5 and 1.1.6 are based on the diagram below that illustrates a part of the human ear.



1.1.5 The part labelled **W** is the:

- A Round window
- B Oval window
- C Eustachian tube
- D Tympanic membrane

1.1.6 Which row in the table below is the correct description of the substances that normally occur in each of the labelled parts **X**, **Y** and **Z**?

	X	Y	Z
A	Air	Fluid	Fluid
B	Mucus	Air	Fluid
C	Air	Air	Fluid
D	Air	Fluid	Mucus

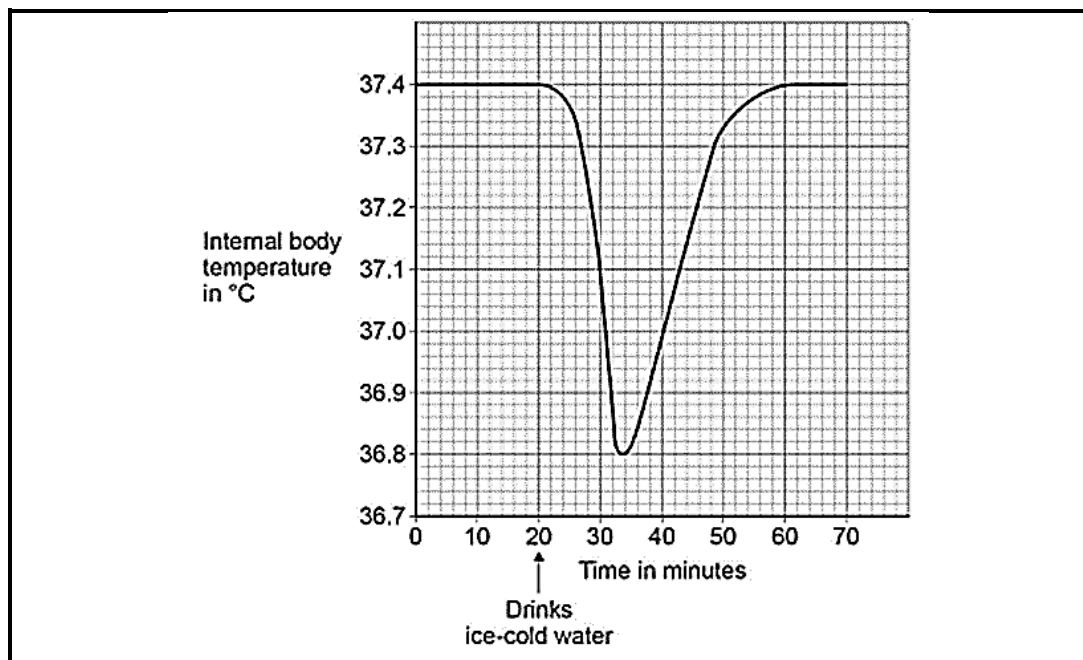


1.1.7 Scientists investigated the effect of drinking ice cold water on the internal body temperature of humans.

The following method was used:

1. Seat a person inside a room kept at a constant temperature of 25 °C.
2. Measure the person's internal body temperature near the brain.
3. Give the person 500 cm³ of ice-cold water to drink.
4. Continue to measure the person's internal body temperature for a further 50 minutes.

The result of the investigation is illustrated in the diagram below:



Consider the following statements:

- i) The body temperature returned to normal 30 minutes after drinking the ice-cold water.
- ii) The drinking of the ice-cold water decreases the body temperature with 0,6 °C.
- iii) The amount of water consumed is the independent variable.

Choose the statement/s that is/are correct according to the graph above:

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



1.1.8 The advantage of the testes being held in the scrotum, outside the body cavity is:

- A the testes are more protected in the scrotum than in the body cavity.
- B sperm production is more efficient at temperatures below the normal body temperature.
- C more time for secretion of seminal fluid to be added to the sperm.
- D more sperm can be stored outside the body.

1.1.9 The blood of four people, **W, X, Y and Z**, was tested for glucose levels. The table below illustrates the results:

Person	Concentration of glucose in blood (arbitrary units)
W	4,2
X	6,9
Y	7,1
Z	5,1

The table below illustrates information used to determine if a person has diabetes:

Concentration of glucose in blood (arbitrary units)	Conclusion
<5,6	No diabetes
5,6–7,0	Mild diabetes
>7	Severe diabetes

Which person has mild diabetes?

- A W
- B X
- C Y
- D Z

(9x2) (18)



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 structure in the inner ear where mechanical stimuli are converted into nerve impulses.
- 1.2.2 The increase in the internal diameter of blood vessels so that more blood flows through them.
- 1.2.3 The plant hormone responsible for the shedding of leaves and fruit.
- 1.2.4 The mineral that prevents the development of goitre in humans.
- 1.2.5 Tough white outer membrane of the eyeball that protects the eye.
- 1.2.6 The remains of the Graafian follicle, after ovulation, in the female ovary.
- 1.2.7 The narrow tube through which ova travel from the ovary to the uterus.
- 1.2.8 Maintenance of equilibrium of the internal environment of an organism.
- 1.2.9 The hormone that stimulates milk production in the milk glands of females during pregnancy and after the birth process.

(9x1) (9)

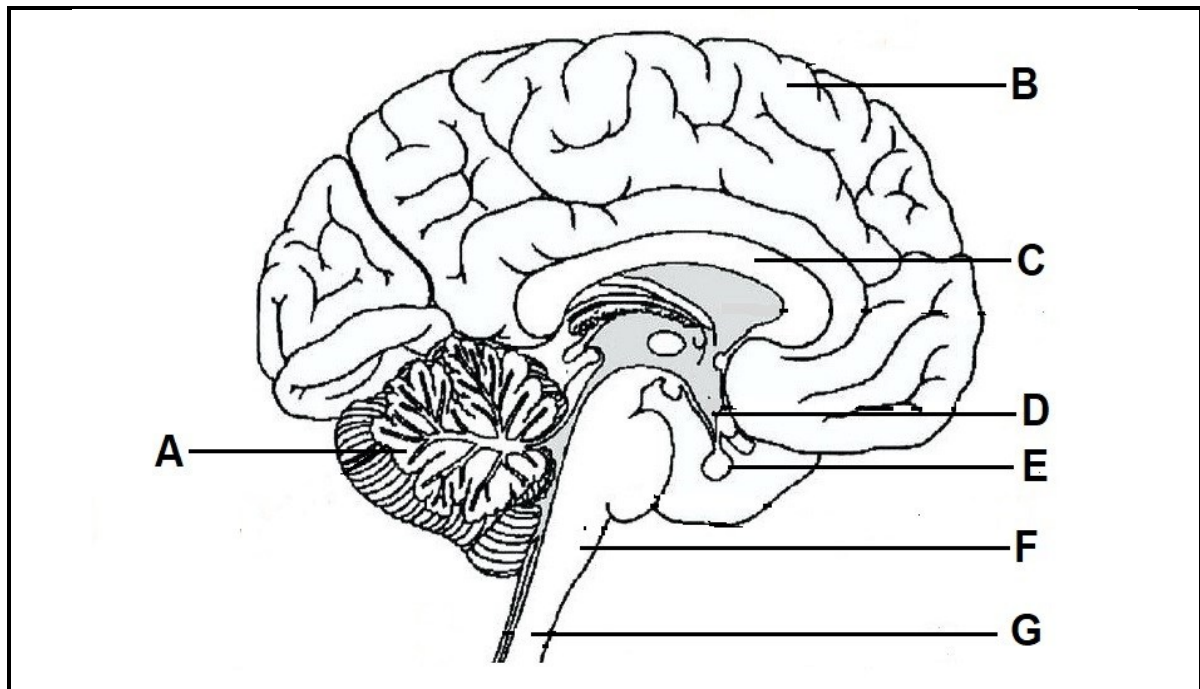
1.3 Indicate whether each of the statements in COLUMN I applies to **A only**, **B only**, **both A and B**, or **NONE** of the items in COLUMN II. Write only **A**, only **B**, **both A and B** or **NONE**, next to the question numbers (1.3.1 to 1.3.3) in the ANSWER BOOK.

COLUMN I	COLUMN II
1.3.1 Eye defects	A. Short-sightedness B. Astigmatism
1.3.2 Target organ of insulin	A. Muscles B. Pancreas
1.3.3 Release of a ripe ovum from the ovary	A. Oogenesis B. Ovulation
1.3.4 Neurological disease/s	A. Alzheimer's disease B. Dementia
1.3.5 High thyroxin levels	A. Results in the increase in secretion of TSH B. Results in low heart rate

(5x2) (10)



1.4 Study the diagram below and answer the questions that follow.



1.4.1 Identify the **part** of the nervous system illustrated in the above diagram. (1)

1.4.2 Identify the parts labelled:

- a) **C** (1)
- b) **E** (1)
- c) **F** (1)

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

- a) Voluntary actions (2)
- b) Hunger (2)
- c) Controlling muscle tone (2)

1.4.4 Give the **letter** of the part that consists of grey matter on the outside and white matter on the inside. (1)

1.4.5 Name the bone/s that protect/s the part labelled:

- a) **B** (1)
- b) **G** (1)

(13)

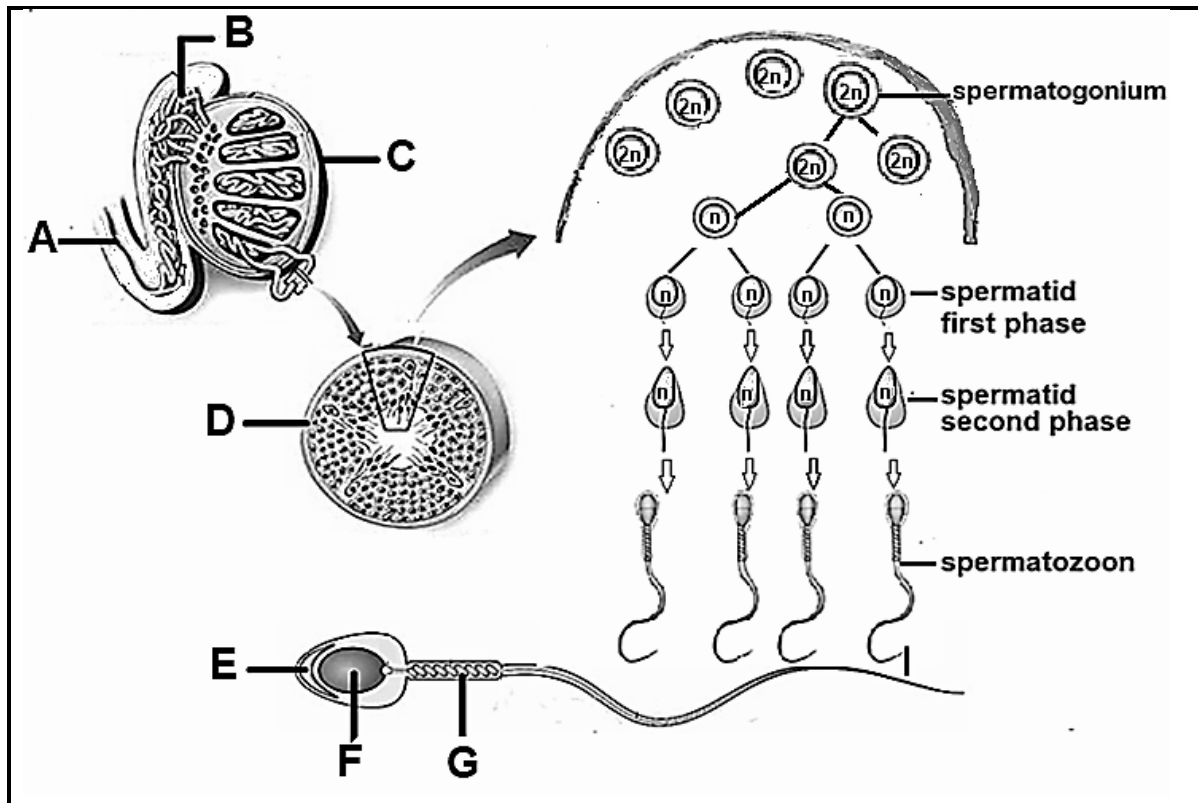
TOTAL SECTION A: [50]



SECTION B

QUESTION 2

2.1 The diagram below illustrates the development of sperm cells. Study the diagram and answer the questions that follow.



2.1.1 Identify the structures labelled:

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

2.1.2 State ONE function of the part labelled **B**. (1)

2.1.3 Name the:

- a) stage of development when a boy's body will start to produce sperm. (1)
- b) type of cell division that will produce spermatids from spermatogonia. (1)
- c) hormone produced by the structure labelled **C**. (1)



2.1.4 Identify the structures in the spermatozoon labelled:

- a) **E** (1)
b) **F** (1)

2.1.5 Describe ONE visible difference in the structure of the first and second spermatid phase. (2)

2.1.6 Explain how the part labelled **G** is adapted to perform its function. (2)

2.1.7 Each testis possesses approximately 750 of the structure labelled **D**.
Explain the possible effect if a male's testis only contains 400 of these structures. (2)

(15)

2.2 Read the following information on plants and answer the questions that follow.

The lack of a nervous system in plants do not prevent them from protecting themselves and reacting to stimuli. If you've ever had the misfortune of brushing against a stinging nettle, you know the pain-inducing power of this plant. Nettles and other plants grow a bristling fur of trichomes to protect them. Nettles have associated glands that inject poison into the trichome-inflicted wounds.

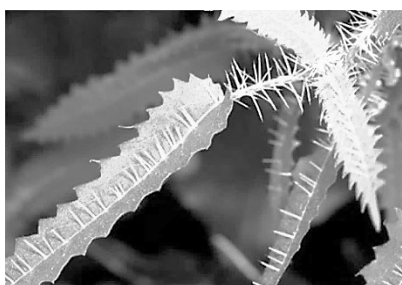


Diagram 1: The New Zealand tree nettle showing secretory or stinging trichomes

Many plants have spines and especially cacti have them in abundance. The savanna trees have many sharp thorns on their stems.



Evidence of how plants react to stimuli is the upwards bending of the stems as illustrated in diagram 2.

Diagram 2: Upwards bending of stem.

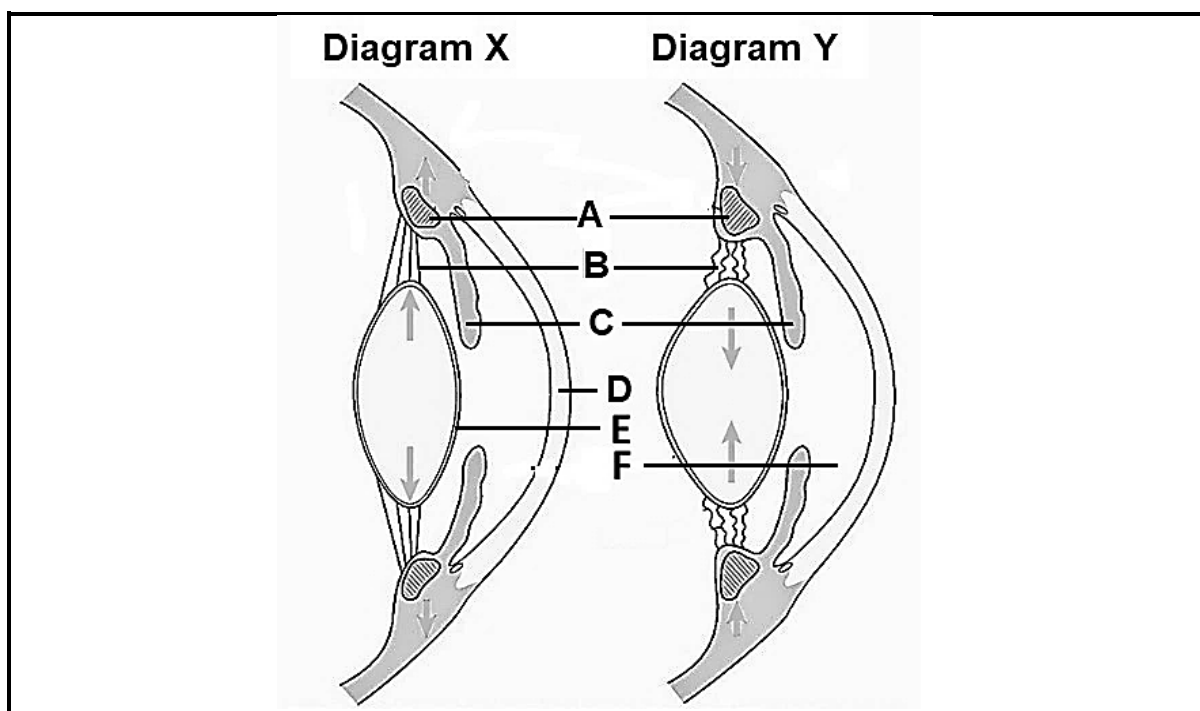
2.2.1 Identify the type of plant defence mechanisms in:

- a) Cacti (1)
b) New Zealand tree nettle (1)



- 2.2.2 Explain the advantage of the presence of thorns on the growth of an acacia tree. (2)
- 2.2.3 Define the term 'stimuli'. (2)
- 2.2.4 Identify the growth response illustrated in **Diagram 2**. (1)
- 2.2.5 Explain the cause of the growth response mentioned in QUESTION 2.2.4. (4)
- (11)**

- 2.3 The diagram below illustrates two eyes focussed on objects at different distances from the eye.



- 2.3.1 Identify the structures labelled:
- a) **A** (1)
- b) **D** (1)
- 2.3.2 Supply the NAME and LETTER of the labelled structure that controls the amount of light that enters the eye. (2)
- 2.3.3 a) Identify the substance that is found in the part labelled **F**. (1)
- b) State ONE function of the substance named in QUESTION 2.3.3 a). (1)



- 2.3.4 Name the process that is responsible for the change of the shape of part **E** as illustrated in the above diagram. (1)
- 2.3.5 Identify the diagram that illustrates the eye while the person is reading a book. (1)
- 2.3.6 Give TWO visible reasons for your answer to QUESTION 2.3.5 (2)
- (10)**

2.4 Read the following information on the reproduction of two bird species and answer the questions that follow.

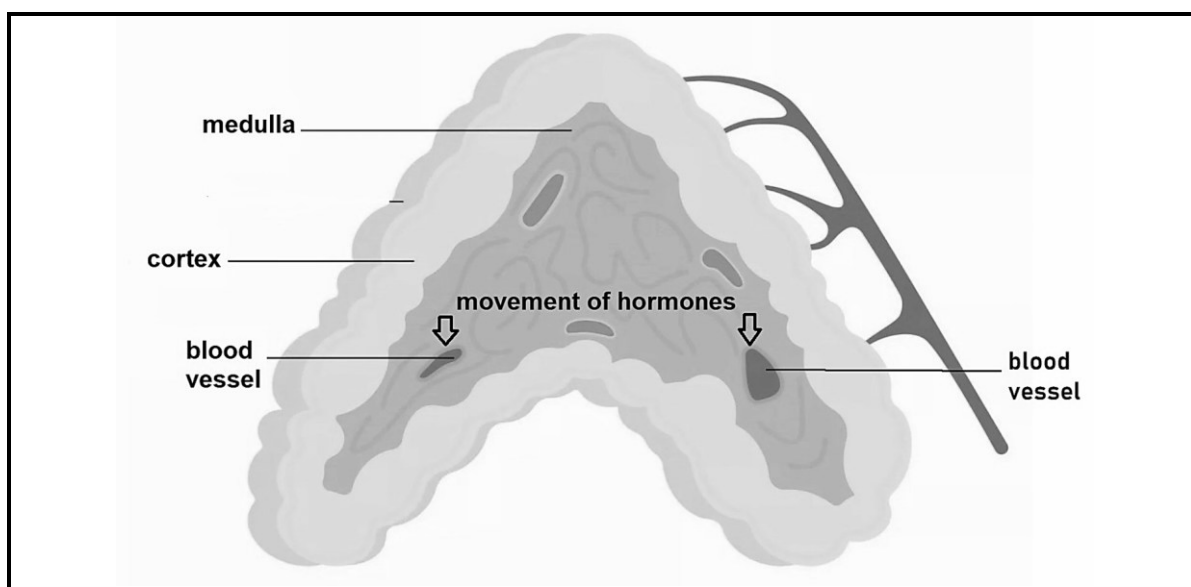
Spotted thick-knee	Pigeon
Female lays 2–3 eggs. Size of eggs: 5,2 cm x 3,6 cm	Female lays 1 or 2 eggs. Size of egg: 3 cm x 2 cm
Males and females take care of the offspring together. They defend the nest with defensive pose and will peck an intruder.	Males and females guard nest and care for the offspring. The young are fed pigeon milk, that is regurgitated by both male and female.
Offspring leave the nest within 24 hours of hatching.	Offspring leave nest and venture out independently after 32-35 days after hatching.
 Day-old chicken	 Day-old chicken

- 2.4.1 Identify the type of development that occurs in pigeons. (1)
- 2.4.2 Give TWO visible reasons for your answer to QUESTION 2.4.1. (2)



- 2.4.3 Explain how the size of the eggs of the two bird species affects the development of the offspring at the time of hatching. (3)
- 2.4.4 Identify the type of bird, from the above information, that spends the most energy on parental care. (1)
- 2.4.5 Explain why birds are oviparous. (1)

2.5 The diagram below illustrates a gland that occurs on top of the human kidney. Study the diagram and answer the questions that follow.



- 2.5.1 Identify the gland illustrated in the diagram above. (1)
- 2.5.2 Name the hormone secreted by the gland in the diagram that:
- regulates the ion balance of the tissue fluid. (1)
 - is known as the 'fight-or-flight' hormone. (1)
- 2.5.3 Describe the effect of the hormone mentioned in QUESTION 2.5.2 b) on the pupil of the eye. (1)
- 2.5.4 Explain ONE visible feature that shows that the diagram above is an endocrine gland. (2)

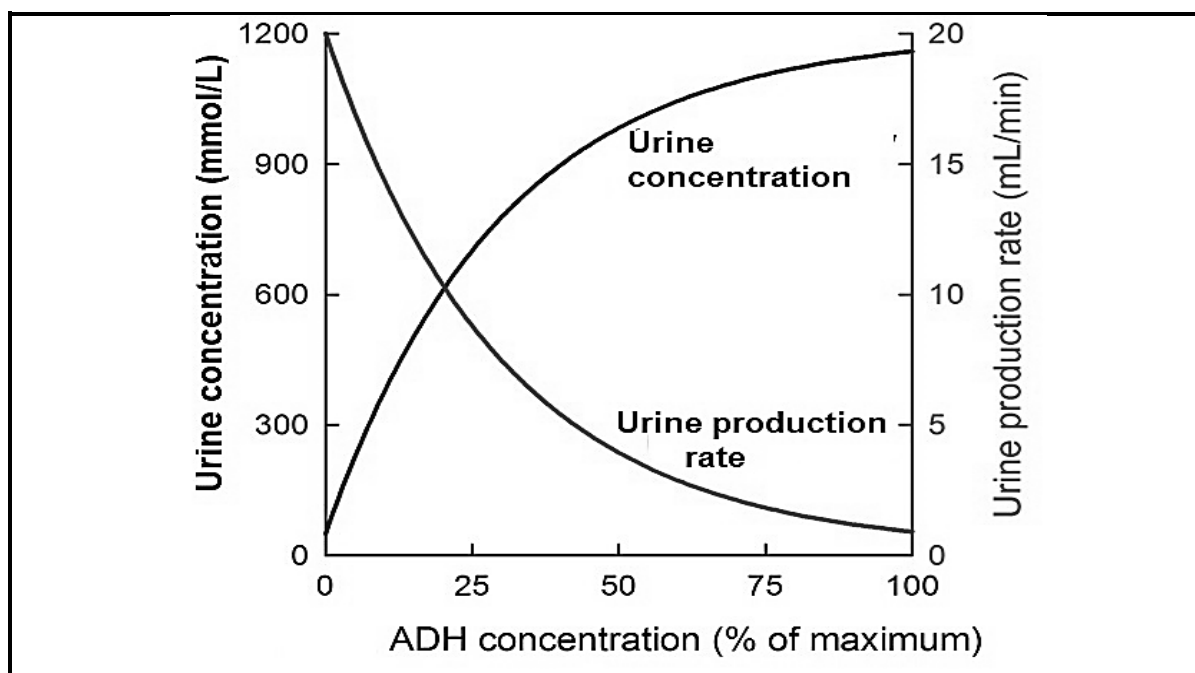
(6)

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QUESTION 3

- 3.1 The diagram below illustrates the rate of urine production and urine concentration at different levels of ADH. Study the diagram and answer the questions that follow.



- 3.1.1 Name the following:

- The gland that produces ADH. (1)
- The gland that stores and releases ADH. (1)
- The target organ of ADH. (1)

- 3.1.2 Describe the relationship between urine concentration and urine production rate. (2)

- 3.1.3 A normal urine concentration is 600 mmol/L.

Use the graph to determine the ADH concentration to maintain a normal urine concentration. (2)

- 3.1.4 Alcohol blocks the release of ADH.

Explain why a person who consumed large amounts of alcohol will experience extreme thirst a few hours after the alcohol consumption. (4)



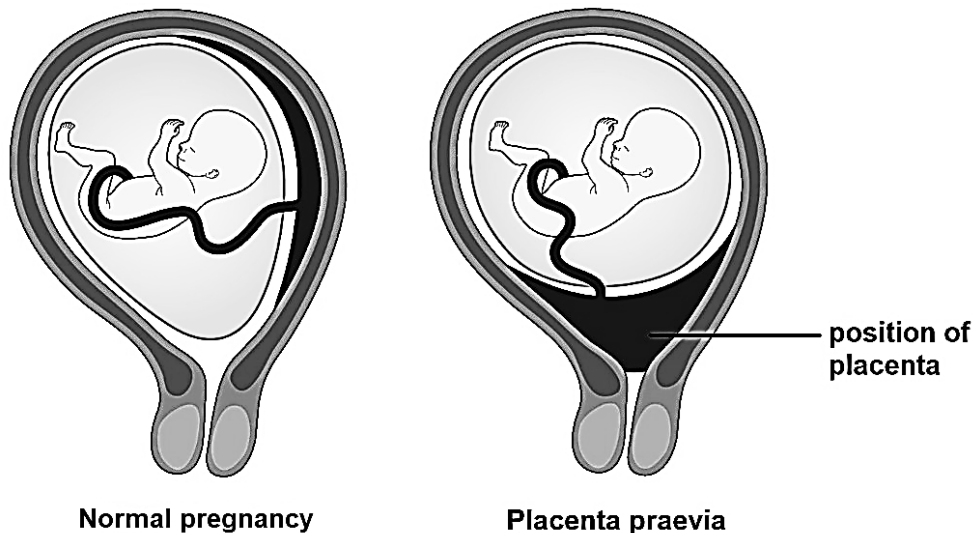
3.1.5 Describe how each of the following will be influenced by vigorous exercise on a very hot day:

- a) Production rate of urine. (1)
- b) Secretion of ADH. (1)

(13)

3.2 Read the following information on the dangers of smoking during pregnancy and answer the questions that follow.

The risk of smoking during pregnancy is high because the inhaled toxins of cigarettes are poisonous to the unborn child. Pregnant smokers are twice as likely to have placenta praevia. The diagram below illustrates placenta praevia.



Women who smoke during pregnancy are more likely to experience premature rupturing of the amniotic sac, making it more difficult for them to carry to full gestational term. Scientists have found a cause-and-effect relationship between smoking or second-hand smoke exposure during pregnancy and low birth weight. In 2020, 19.8 million newborns of all babies born globally that year, suffered from low birthweight.

Researchers suspect that nicotine in the mother's bloodstream may constrict blood vessels in the umbilical cord and uterus. E-cigarette vapour contains fewer toxic chemicals than traditional cigarette smoke, but it does deliver some potent poisons and cancer-causing chemicals to both mother and child.

3.2.1 Name the stage of development of the unborn child at 9 weeks after fertilisation. (1)

3.2.2 Describe the difference between placenta previa and a normal pregnancy. (2)



- 3.2.3 Calculate the percentage of newborn babies born with low birthweight in 2020 if 135 million babies were born globally. Show all your calculations and round your answer off to one decimal. (3)
- 3.2.4 Explain why the unborn child of a smoking mother might receive less oxygen. (2)
- 3.2.5 State TWO functions of the amniotic fluid. (2)
- 3.2.6 The use of e-cigarettes or vaping is very popular, especially under teenagers in South Africa, and the use is expected to increase with 7% from 2024 to 2030.
Explain how the chemicals in e-cigarettes will reach the blood stream of the unborn baby. (3)
- 3.2.7 Suggest TWO strategies how the South African Department of Health can warn females about the danger of vaping during pregnancy. (2)
- (15)

3.3 Read the following information and answer the questions that follow.

A scientist investigated the reaction time of two males; John that is 36 years old and David that is 20 years old. John and David had to push a key on a computer as soon as a light flashed on the screen. The time it took each of them to react to the light was recorded. The experiment was repeated 8 times. The results were recorded and are illustrated in the table below.



	Reaction time (seconds)							
Repetition	1	2	3	4	5	6	7	8
David	0,3	0,3	0,15	0,05	0,1	0,15	0,2	0,10
John	0,45	0,4	0,4	0,25	0,25	0,3	0,25	0,20

- 3.3.1 Draw two-line graphs on the same set of axes to illustrate the results of this investigation. (7)
- 3.3.2 Formulate a hypothesis for the scientist's investigation. (2)



- 3.3.3 Identify the fastest reaction time recorded. (1)
- 3.3.4 Name TWO variables that the scientist had to control in this investigation. (2)
- 3.3.5 State the following:
- a) The conclusion from the scientist's data. (2)
 - b) TWO ways how the scientist could increase the reliability of this investigation. (2)
- 3.3.6 Explain how the absence of myelin sheath on neurons will affect a person's reaction time. (2)
- 3.3.7 Identify the following parts of David's nervous system that was involved in his reaction to the flashing light:
- a) The effector. (1)
 - b) The part of the brain that became aware of the light. (1)
 - c) The receptor. (1)
 - d) The type of neurons that conducted the impulses from the effector to the central nervous system. (1)

(22)

[50]

TOTAL SECTION B: [100]

GRAND TOTAL: [150]