KWAZULU-NATAL PROVINCE

EDUCATION
REPUBLIC OF SOUTH AFRICA

PROVINCIAL STANDARDISED ASSESSMENT

GRADE 12

LIFE SCIENCES P1

PREPARATORY EXAMINATION

SEPTEMBER 2026

MARKS: 150

TIME: 2½ Hours

N.B. This question paper consists of 16 pages including this page.

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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. Make 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.

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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 to D) next to the question number (1.1.1 to 1.1.10) in your ANSWER BOOK, for example 1.1.11 D.

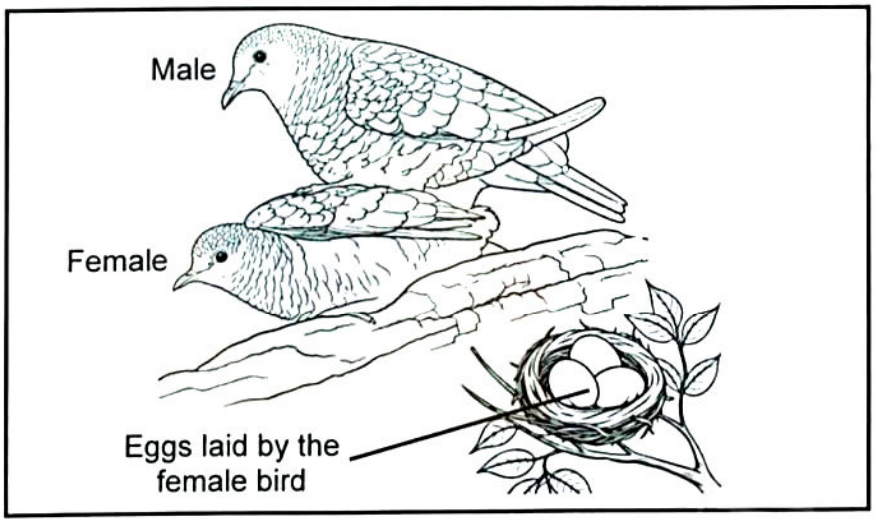
1.1.1 Which ONE of the following structures absorbs excess pressure from the inner ear?

A Ossicles
B Tympanic membrane
C Oval window
D Round window

1.1.2 Which ONE of the following is a characteristic feature of Alzheimer's disease?

A Progressive loss of memory
B Loss of sensation
C Increased abilty to form new memories
D Increased concentration ability

1.1.3 The diagram below shows stages of reproduction in birds.



Which ONE of the following reproductive strategies applies to the bird species shown in the above diagram?

A Internal fertilisation and ovipary
B External fertilisation and ovipary
C Internal fertilisation and ovovivipary
D External fertilisation and ovovivipary

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1.1.4 Below is a list of functions of the different parts of a neuron.

(i) Speeds up impulse transmission
(ii) Controls the functioning of a nerve
(iii) Carries impulses away from the axon
(iv) Insulates the axon

Which ONE of the following combinations relates to the function/s of the myelin sheath?

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

1.1.5 Which ONE of the following is the CORRECT function of abscisic acid?

A Promotes seed dormancy
B Promotes seed germination
C Promotes fruit growth and development
D Promotes leaf growth and development

1.1.6 Which ONE of the following occurs in the eye under bright light?

A Ciliary muscles contract
B Radial muscles relax
C Circular muscles relax
D Radial muscles contract

1.1.7 Below is a list of events during thermoregulation.

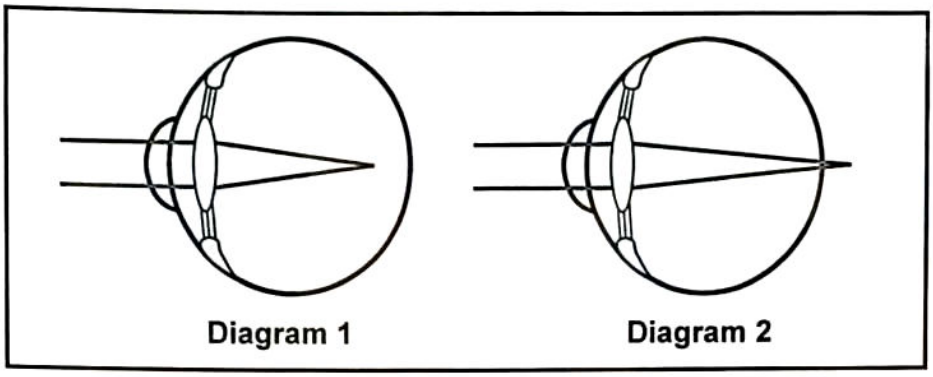
(i) Blood vessels of the skin constrict
(ii) Hypothalamus is stimulated
(iii) More heat is lost through evaporation
(iv) Less blood flows closer to the surface of the skin

Which ONE of the following combinations of events occurs on a hot day?

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

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1.1.8 The diagrams below show two eye defects.

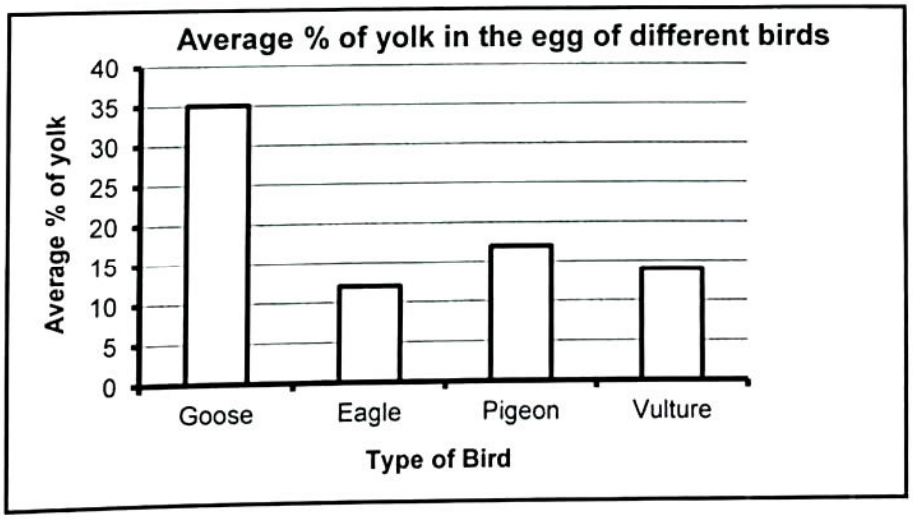


Which ONE of the following is the correct eye defect and corrective lens for it?

	DIAGRAM	EYE DEFECT	CORRECTIVE LENS
A	1	Long-sightedness	Concave
B	1	Short-sightedness	Convex
C	2	Short-sightedness	Concave
D	2	Long-sightedness	Convex

QUESTIONS 1.1.9 and 1.1.10 ARE BASED ON THE FOLLOWING GRAPH SHOWING THE YOLK CONTENT OF DIFFERENT BIRDS.

NB: The main source of energy for development in birds is the yolk.



1.1.9 Which ONE of the following birds' hatchlings will be least developed?

A Goose
B Eagle
C Pigeon
D Vulture

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1.1.10 Which ONE of the following conclusions is best supported by the information provided in the graph?

A Vulture hatchlings are less precocial than the other hatchlings.
B Goose hatchlings will require less parental care than the other hatchlings.
C Vulture hatchlings are more precocial than the other hatchlings.
D Goose hatchlings will require more parental care than the other hatchlings.

(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 A structure that acts as micro-filter during the development of the foetus

1.2.2 Having two eyes positioned at the front of the head, resulting in an overlapping field of view

1.2.3 A plant growth substance which stimulates seed germination

1.2.4 The fluid in the eye between the lens and the cornea

1.2.5 A phenomenon in which auxins produced at the stem tip inhibit the growth of lateral branches

1.2.6 A directional growth response of a plant to an external stimulus

1.2.7 An endocrine disorder which causes swelling of the thyroid gland

1.2.8 The outermost part of an ear that collects and directs sound waves into the auditory canal

1.2.9 A visual defect caused by the clouding of the lens (9 × 1) **(9)**

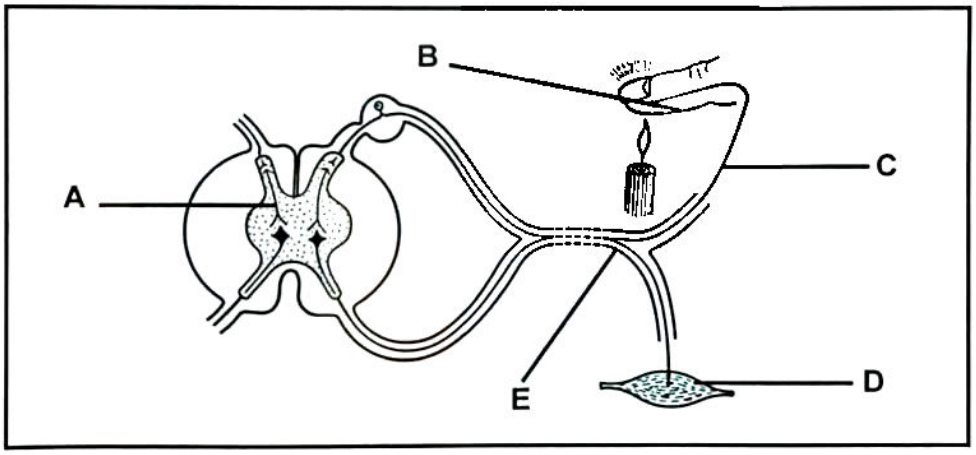
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1.3 Indicate whether each of the descriptions in COLUMN I applies to **A ONLY**, **B ONLY**, **BOTH A AND B** or **NONE** of the items in COLUMN II. Write **A only**, **B only**, **both A and B** or **none** next to the question number (1.3.1 to 1.3.3)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

	COLUMN I	COLUMN II
1.3.1	Part of a sperm cell which carries genetic information	A: Nucleus B: Acrosome
1.3.2	Branch of the autonomic nervous system that restores an increased heart rate back to normal	A: Sympathetic B: Parasympathetic
1.3.3	Reproductive strategy that increases embryo survival	A: External fertilisation B: Internal fertilisation

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

1.4 The diagram below shows a reflex arc.



1.4.1 Identify:

(a) Part **A** (1)

(b) Neuron **C** (1)

(c) Part **E** (1)

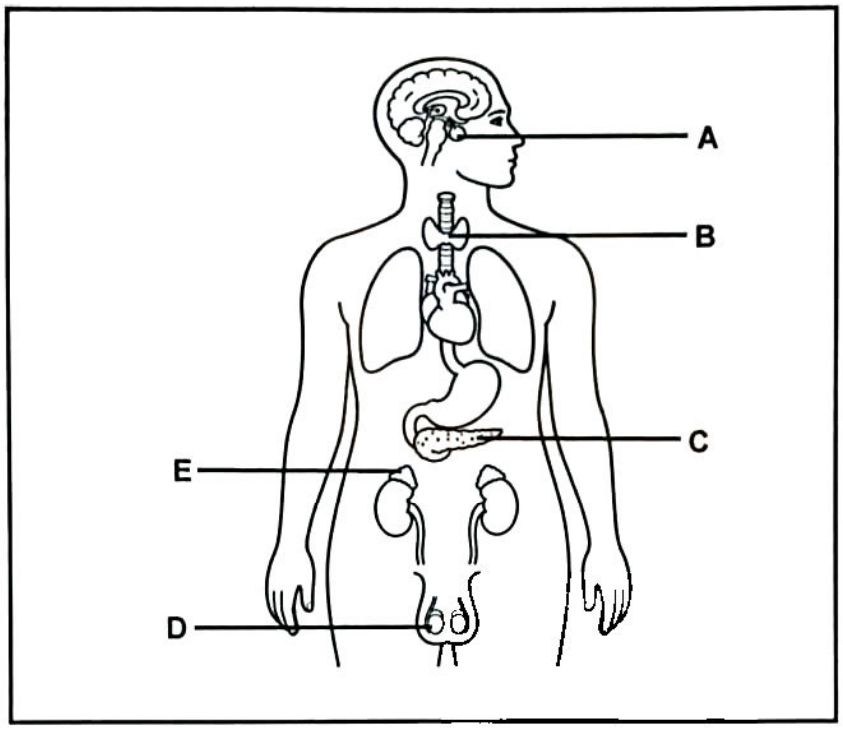
1.4.2 Write down the LETTER only of the part shown in the diagram that:

(a) Converts a stimulus into an impulse (1)

(b) Receives impulses from the central nervous system (1)
(5)

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1.5 The diagram below shows the location of different endocrine glands.



1.5.1 Give TWO hormones produced by gland **A**. (2)

1.5.2 Give the LETTER and NAME of the gland that:

(a) Produces a hormone which controls metabolism (2)

(b) Secretes a hormone that controls osmoregulation (2)

(c) Secretes insufficient hormone in a person with diabetes mellitus (2)

(d) Secretes a hormone which controls salt concentration in the blood (2)
(10)

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 The diagrams below represent the process of gametogenesis.

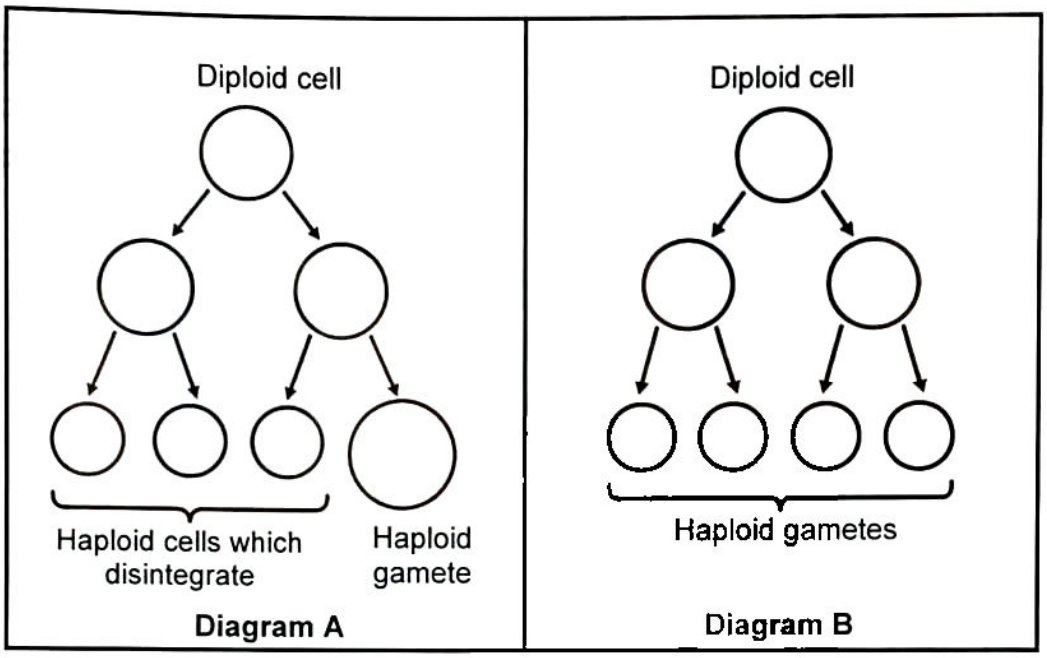


Diagram A **Diagram B**

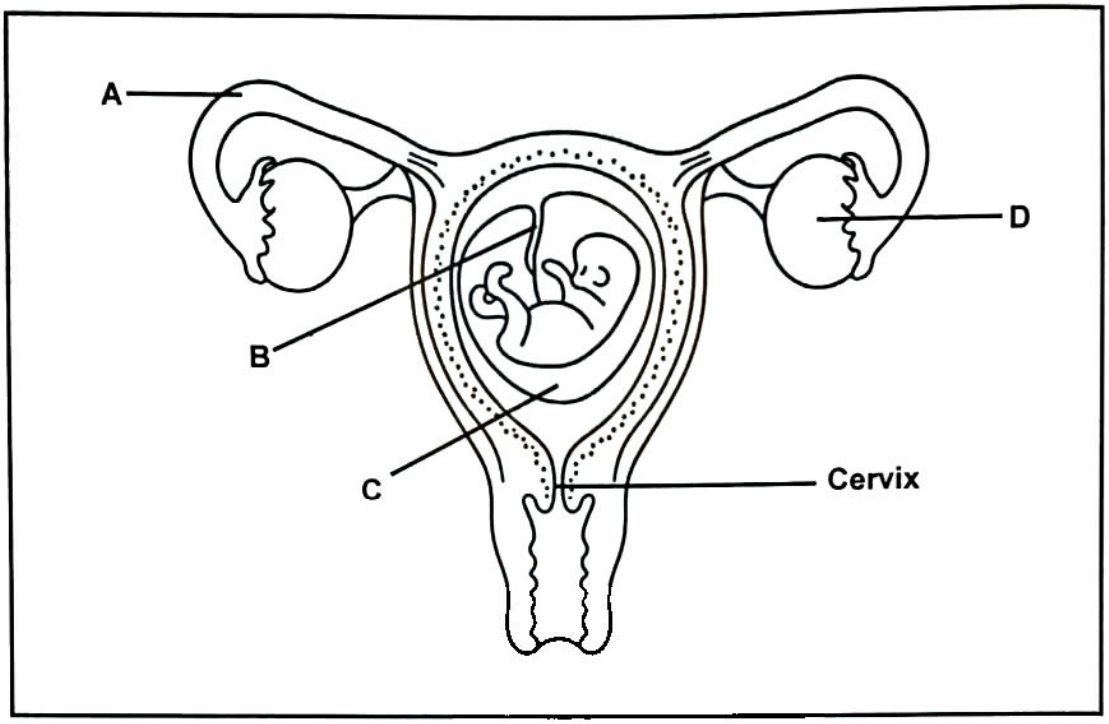
2.1.1 Identify the type of gametogenesis represented in diagram **A**. (1)

2.1.2 State ONE visible difference between gametogenesis in diagram **A** and the gametogenesis in diagram **B**. (2)

2.1.3 Describe the type of gametogenesis represented by diagram **B**. (4)

2.1.4 Draw a labelled diagram of a mature haploid gamete formed in diagram **A**. (4)
(11)

2.2 The diagram below shows a developing foetus inside the female reproductive system.



2.2.1 Identify part **D**. (1)

2.2.2 Part **A** is the site for fertilisation.

Describe the process of fertilisation. (4)

2.2.3 Give TWO functions of fluid **C**. (2)

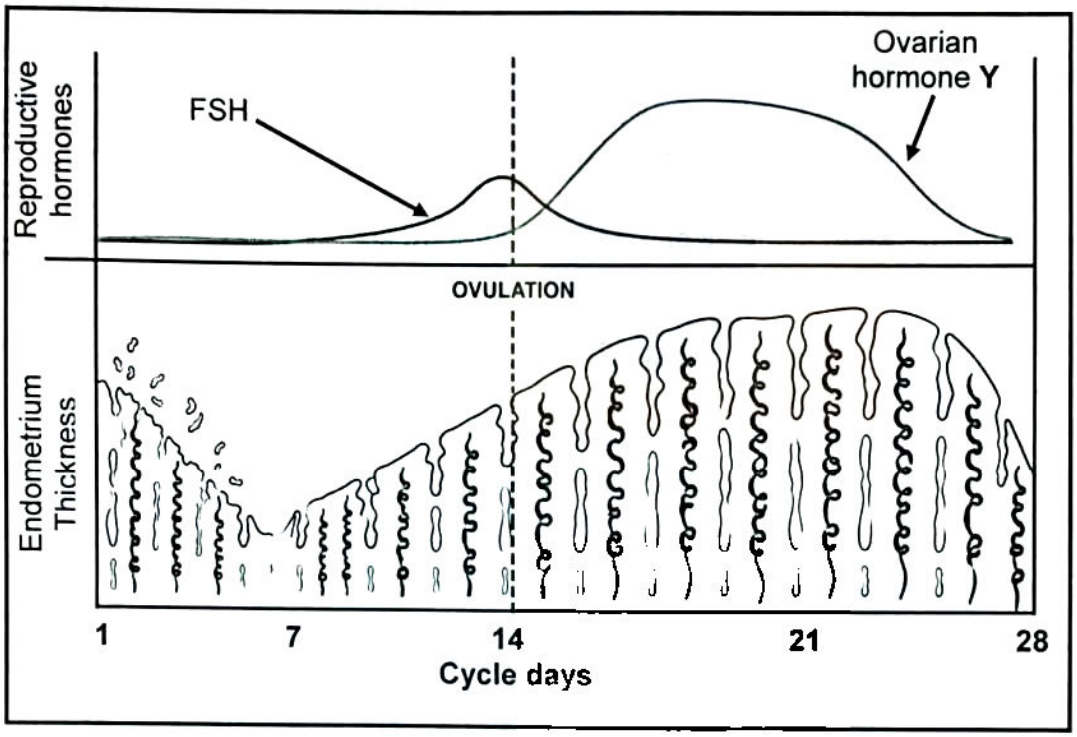
2.2.4 Tabulate TWO differences in the composition of blood found in artery and vein at **B**. (5)

2.2.5 In females with *cervical stenosis*, the cervix becomes abnormally narrow or completely blocked/closed.

Explain how complete blockage of the cervix could affect fertility in a female. (2)

2.2.6 Describe the development of the zygote in part **A**. (4)
(18)

2.3 The diagram below shows two female reproductive hormones and the thickness of the endometrium of a particular female during her menstrual cycle.



2.3.1 Name the:

(a) Pituitary hormone that is responsible for ovulation (1)

(b) Process taking place between day **1** and day **7** (1)

(c) Ovarian hormone that increases between day **7** and day **14** of the menstrual cycle (1)

2.3.2 Explain how the level of hormone **Y** would be different between day **21** and day **28** if fertilisation occurred during this menstrual cycle. (3)

2.3.3 *Resistant ovary syndrome* is a rare condition where a female has a normal number of primary follicles in her ovaries but they fail to respond to follicle stimulating hormone.

Explain how *Resistant ovary syndrome* would affect the process of ovulation in the affected female. (3)
(9)

2.4 Cigarette smoke contains chemicals that can irritate and inflame structures of the ear involved in maintaining normal air pressure in the middle ear. Prolonged exposure to cigarette smoke may therefore increase the risk of middle ear infections.
A group of investigators conducted an investigation to determine whether regular exposure to cigarette smoke is associated with an increased incidence of middle ear infections in children.

Twenty children between the ages of 3 and 5 years were selected and divided into two groups:

- **Group A:** 10 children who lived in homes where at least one adult smoked indoors on a daily basis.
- **Group B:** 10 children who lived in smoke-free homes.
- The children were monitored for six months.

The number of children in each group who were diagnosed with at least one middle ear infection during the investigation is shown in the table below.

GROUP	HOME ENVIRONMENT	NUMBER OF CHILDREN WITH MIDDLE EAR INFECTION
A	Exposure to cigarette smoke	7
B	Smoke-free home	2

2.4.1 Name the structure of the ear that is responsible for equalising air pressure between the middle ear and the external environment. (1)

2.4.2 State ONE method that may be used to treat a middle ear infection. (1)

2.4.3 Calculate the percentage of children in Group **A** who developed at least one middle ear infection during the six-month investigation. Show ALL working. (3)

2.4.4 Based on the results of the investigation, state the conclusion regarding the relationship between regular exposure to cigarette smoke and the incidence of middle ear infections in children. (2)
(7)

2.5 Describe the growth response of a plant stem when it is exposed to light from one direction. **(5)**
[50]

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QUESTION 3

3.1 The eye has three layers and is a delicate sense organ which plays a major role in human response to the environment.

3.1.1 State TWO functions of the choroid. (2)

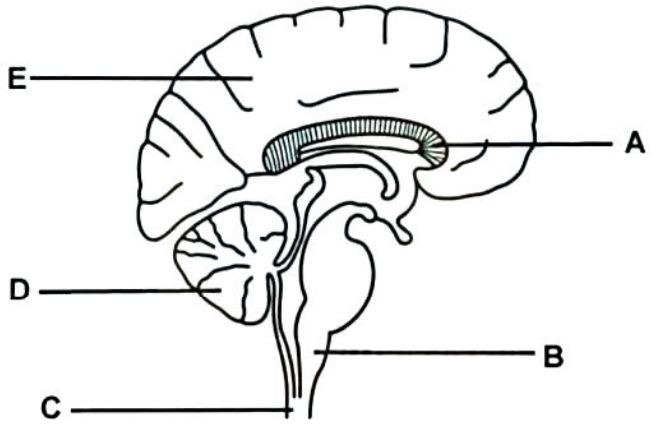
3.1.2 Describe the accommodation of the eye when viewing an object that is more than 6 m away. (5)
(7)

3.2 Read the extract below.

A 42-year-old cyclist was involved in a serious accident and sustained injuries to several parts of his body, including the brain. After regaining consciousness, the medical team conducted a neurological assessment and made the following observations:

- He was unable to coordinate voluntary movements effectively and frequently lost his balance while walking.
- His breathing rate and heart rate remained normal.
- He was able to think clearly, recall events and make decisions.
- Medical investigations confirmed that communication between the left and right cerebral hemispheres remained unaffected.

The diagram below represents the human brain, with different regions labelled **A, B, C, D** and **E**



Human brain

3.2.1 Identify part **D**. (1)

3.2.2 Give the LETTER representing the part of the brain that:

(a) Controls thinking and decision making (1)

(b) Connects two halves of the brain (1)

3.2.3 Explain:

(a) Why the patient was able to breathe normally despite having sustained a severe brain injury. (3)

(b) The consequence if part **C** was severely damaged at a point just above the waist during the accident (3)
(9)

3.3 Describe the role of an ear in maintaining balance. **(7)**

3.4 The endocrine system maintains normal functioning of the body through homeostasis.

3.4.1 Define *homeostasis*. (1)

3.4.2 State ONE difference between an endocrine gland and an exocrine gland. (2)

3.4.3 Describe the negative feedback mechanism involving thyroxin that regulates metabolism when the body requires increased energy. (5)

3.4.4 A person with diabetes cannot produce sufficient glucagon to regulate blood glucose levels.

Explain why an adrenalin injection can be used to treat this person. (3)
(11)

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3.5 Physical activity affects the carbon dioxide levels in the blood.

A group of learners conducted an investigation to determine the effect of exercise intensity on the carbon dioxide levels in the blood.

The procedure was as follows:

- Permission was obtained from 15 healthy 16-year-old boys to participate in the investigation.
- The boys were divided into three groups of five participants each.
- The participants were allowed to rest for 30 minutes.
- The initial carbon dioxide level in the blood was measured and recorded for all participants.
- The participants then performed different exercises.
- Group **A** walked slowly, Group **B** jogged slowly, and Group **C** ran quickly for 10 minutes each.
- The average carbon dioxide concentration was calculated and recorded for each group.

The table below shows the average carbon dioxide levels of the three groups.

GROUP	EXERCISE INTENSITY	CARBON DIOXIDE LEVEL BEFORE EXERCISE (mL/min)	CARBON DIOXIDE LEVEL AFTER EXERCISE (mL/min)
A	Low	180	220
B	Moderate	185	300
C	High	190	410

3.5.1 Identify the:

(a) Dependent variable (1)

(b) Independent variable (1)

3.5.2 State TWO:

(a) Planning steps for this investigation (2)

(b) Factors that were considered when selecting the participants. (2)

3.5.3 Explain why five participants were used in each group instead of only one participant. (2)

3.5.4 Why did the learners use different exercise intensities in this investigation? (1)

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3.5.5 Explain:

(a) ONE reason why the participants were allowed to rest for 30 minutes before the investigation began. (2)

(b) The effect of high-intensity exercise on the increase in carbon dioxide levels in the blood. (3)

3.5.6 State the conclusion for this investigation. (2)

(16)

[50]

TOTAL SECTION B: 100

GRAND TOTAL: 150

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