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GRADE 12

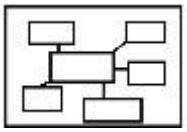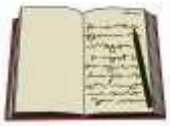
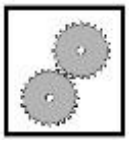
SPRING SCHOOL

TEACHER AND LEARNER CONTENT MANUAL

2026

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ICON DESCRIPTION

 MIND MAP	 EXAMINATION GUIDELINE	 CONTENTS	 ACTIVITIES
 BIBLIOGRAPHY	 TERMINOLOGY	 WORKED EXAMPLES	 STEPS

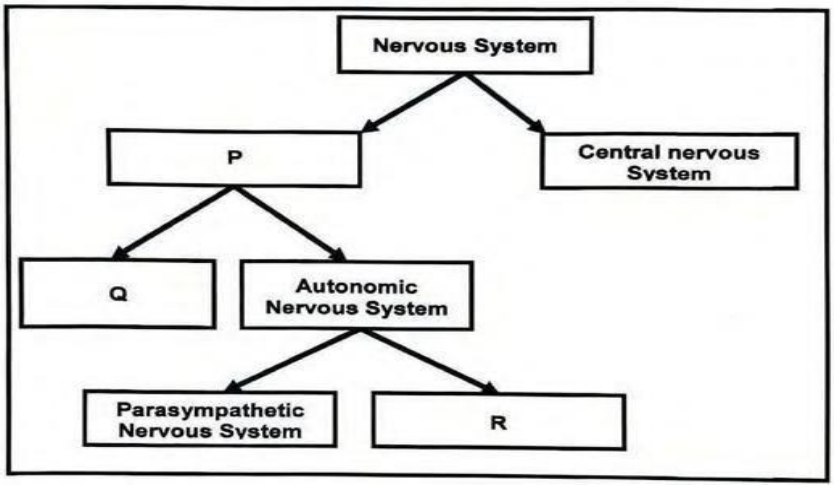
CONTENTS **PAGE**

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2. Peripheral nervous system	6 - 11
3. Human eye	11 – 17
4. Human ear	11- 17
5. Endocrine system	17 – 22
6. Homeostasis	17 – 22
7. Negative feedback mechanism	17 – 22

CONTENT	ELABORATION
Introduction	❑ The nervous system (involving nerves) and endocrine system (involving hormones) are two components that help humans respond to the environment
Human nervous system	❑ The need for a nervous system in humans: • Reaction to stimuli (stimuli can be external and internal) • Coordination of the various activities of the body
Central nervous system	❑ The brain and spinal cord are protected by meninges ❑ Location and functions of the following parts: • Brain ○ Cerebrum ○ Cerebellum ○ Corpus callosum ○ Medulla oblongata • Spinal cord

Activity 1

1.1. The diagram below is based on the human Nervous System



1.1.1 Identify branch **P** of the nervous system which is made up of all the nerves outside the central nervous system. (2)

1.1.2 Name TWO parts that make up the central nervous system (2)

1.1.3 State ONE function of branch **Q** of the nervous system. (1)

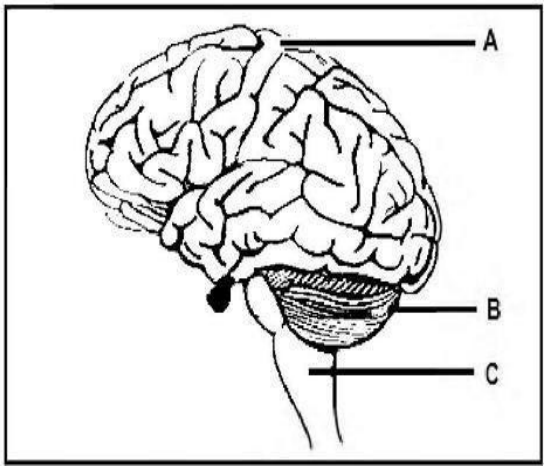
1.1.4 Name the TWO groups of nerves that make up branch **P** of the nervous system (2)

1.1.5 Describe the role of branch **R** of the nervous system when a person is chased by a dog. (5)

(11)

Activity 2

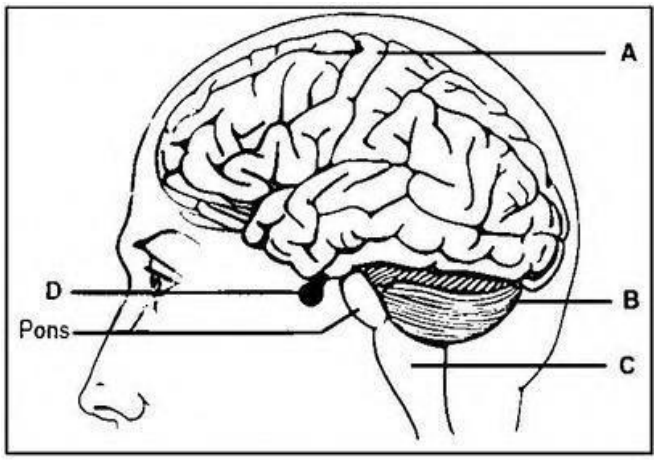
2.1 The diagram below represents the parts of the human brain



2.1.1 Give the LETTER and the NAME of the part that coordinates voluntary movement (2)
2.1.2 State TWO functions of part B. (2)
2.1.3. Give two involuntary actions that are controlled by part C. (2)
(6)

Activity 3 *(Northwest Sep 2024)*

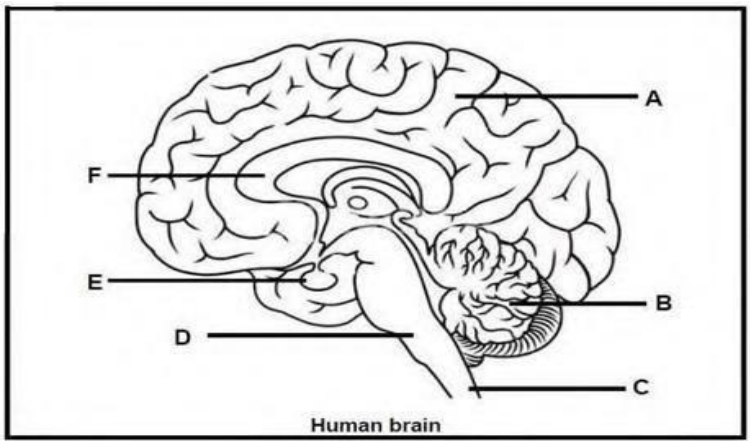
3.1. The diagram below represents the human brain.



3.1.1 Identify the part labelled B and give its function. (2)
3.1.2 Identify the part of the brain that receives impulses from the optic nerve. (1)
3.1.3 Name part C. (1)
3.1.4 Describe how balance and equilibrium are maintained by the ear when a person changes their speed and direction of movement. (6)
(10)

Activity 4 *(Western Cape Sep 2025*

The diagram below shows the human brain.



4.1.1. Write down the LETTER and NAME of the part that:

(a) Joins the two hemispheres of part A. (2)

(b) Co-ordinates voluntary actions (2)

(c) Is an endocrine gland (2)

4.1.2. State TWO ways in which the brain is protected (2)

4.1.3. Concussion is a type of traumatic brain injury where the head and brain move rapidly back and forth. It can cause blurry vision, confusion and slurry speech

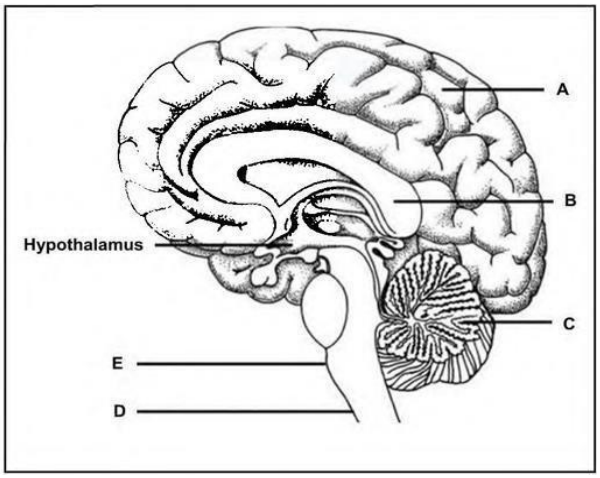
(a) NAME the part of the brain that will be affected by a concussion. (1)

(b) Explain why a concussion does not affect heart rate. (1)

(11)

Activity 6 (*Northern Cape 2024 Sep)*

6.1. The diagram below shows the part of the central system of a human



6.1.1. Identify part:

(a) B

(b) E (1)

(1)

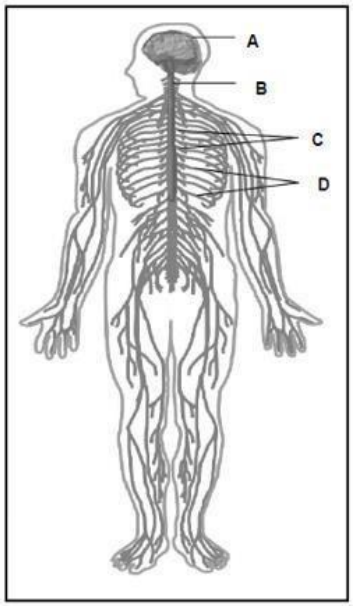
6.1.2. Only give the LETTER of the part responsible for a reflex action that occurs when stepping on a sharp object while barefoot. (1)
6.1.3. Name the system of membranes that surrounds the brain. (1)
6.1.4. State TWO functions of part C. (2)
6.1.5. Explain how the reabsorption of water of a person who injured the hypothalamus in an accident, will be affected. (3)

(9)

Peripheral nervous system	❑ Location and functions of the peripheral nervous system (cranial and spinal nerves)
Autonomic nervous system	❑ Location and functions of the autonomic nervous system (sympathetic and parasympathetic sections)
Structure and functioning of a nerve	❑ Nerves send and carry signals to and from all parts of the body and are made up of neurons (sensory or motor) ❑ Functions of sensory and motor neurons ❑ Structure and functions of parts of sensory and motor neurons, using diagrams: nucleus, cell body, cytoplasm, myelin sheath, axon and dendrites
The simple reflex arc	❑ Definition of a reflex action and a reflex arc ❑ Structure of a reflex arc and functions of each part, using a diagram: receptor, sensory neuron, dorsal root of spinal nerve, spinal cord, interneuron, motor neuron, ventral root of spinal nerve, effector ❑ Functioning of a simple reflex action, using an example ❑ Significance of a reflex action ❑ Significance of synapses
Disorders of the CNS	❑ Causes and symptoms of the following disorders of the nervous system: • Alzheimer's disease • Multiple sclerosis
Receptors	❑ Functions of receptors, neurons and effectors in responding to the environment ❑ The body responds to a variety of different stimuli, such as light, sound, touch, temperature, pressure, pain and chemicals (taste and smell). (No structure and names necessary except for names of the receptors in the eye and ear.)

Activity 7 (PNS) *(FS,2023)*

7.1 The following diagram is a representation of the CNS and PNS



7.1.1 State the term that the following abbreviations represent:

(a) CNS (1)

(b) PNS (1)

7.1.2 Give the LETTERS represent the:

(a) CNS (2)

(b) PNS (2)

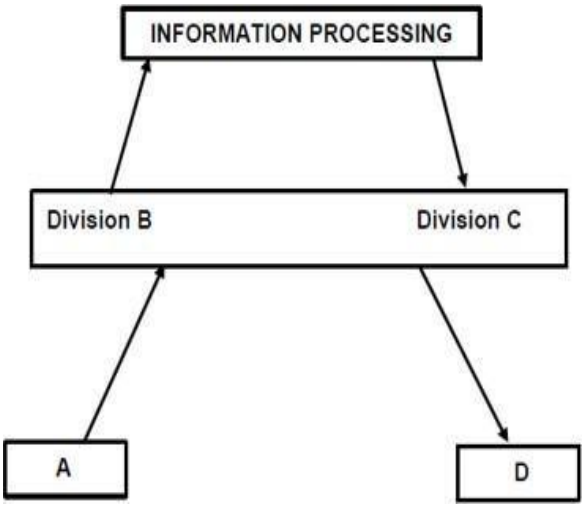
7.1.3 Tabulate FIVE differences between these two nervous systems mentioned above (11)

7.1.4 Name the TWO divisions that we get with the PNS. (2)

7.1.5 Name ONE function of each of these divisions. (2)

(21)

7.2 Study the diagram



7.2.1 A is a type of input that must go to the CNS give one word for this input. (1)

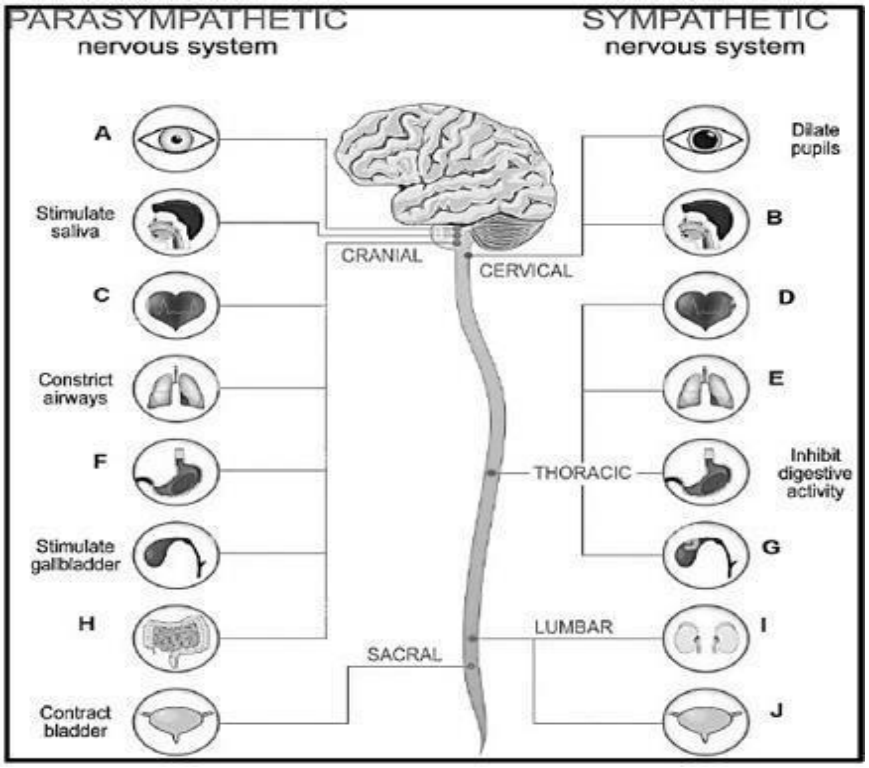
7.2.2 D is a type of output that received a message from the CNS, give one word for this output (1)

7.2.3 Identify divisions B and C. (2)

7.2.4 What does the label information processing represent? (1)

(5)

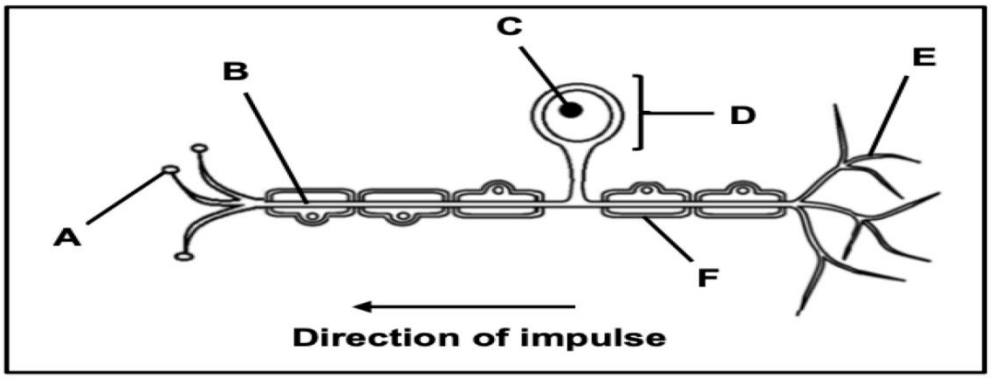
7.3. The diagram below shows the two sections of the autonomic nervous system namely parasympathetic and sympathetic. Write down the appropriate labels of the following symbols.



A	
B	
C	
D	
E	
F	
G	
H	
I	
J	

Activity 8 *(2025 Nov p1)*

8.1. The diagram below shows the structure of a neuron.



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

8.1.2 Identify part:

(a) B (1)

(b) D (1)

(c) E (1)

8.1.3 Give the LETTER of the part that:

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

(b) Insulates the neuron (1)

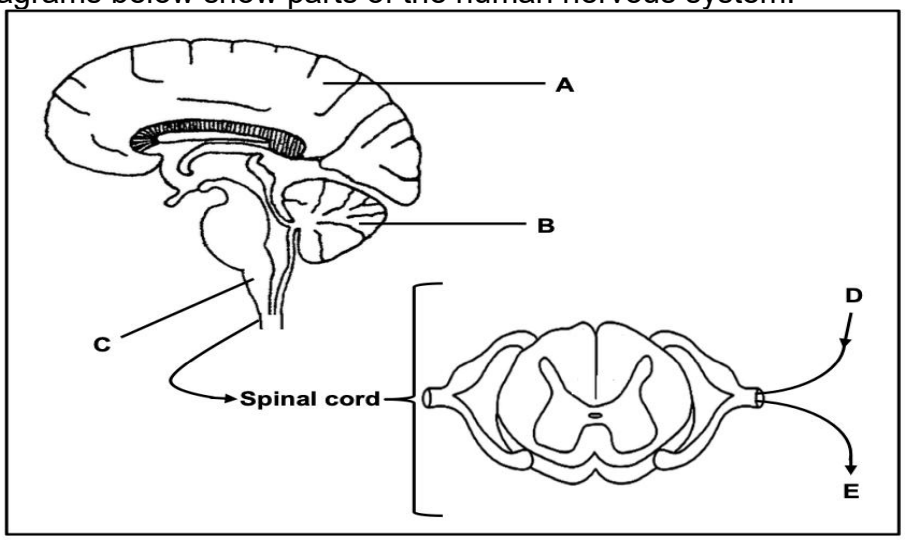
(c) Makes synaptic contact with an interneuron (1)

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

(7)

Activity 9 *(Nov 2025 P1)*

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



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

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

(a) Balance and coordination (1)

(b) Control of skeletal muscles (1)

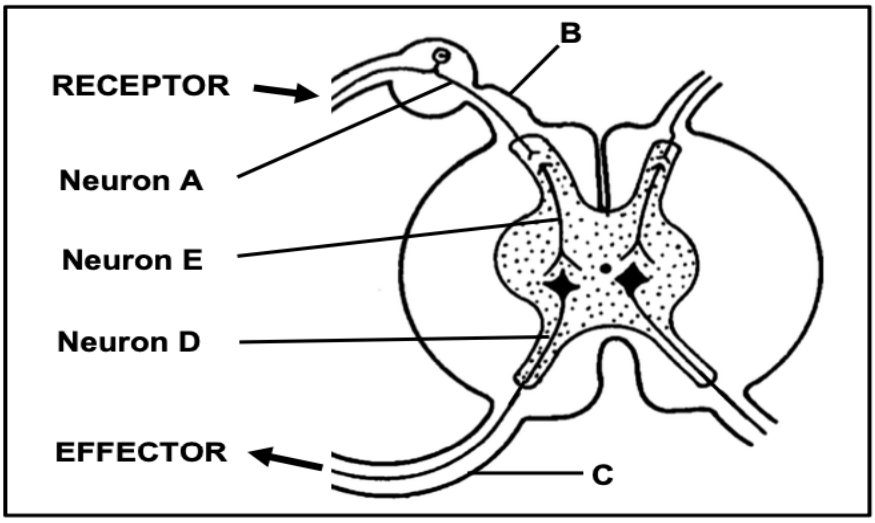
(c) Control of skeletal muscles (1)

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

(10)

ACTIVITY 10 *(DBE MAY/JUNE 2025)*

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



10.1.1 Give the LETTER of the part that represents the:

(a) Dorsal root (1)

(b) Sensory neuron (1)

10.1.2. State the significance of a synapse. (1)

10.1.3. Explain the:

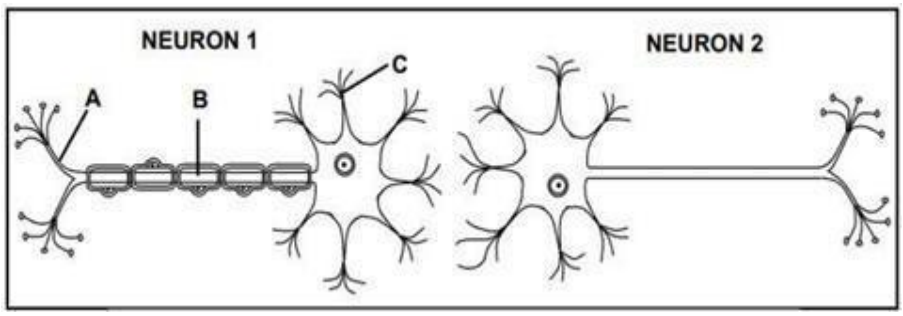
(a) Significance of a reflex action (2)

(b) Effect on the reflex arc if neuron **A** is cut (3)

10.1.4. Draw a labelled diagram to show the detailed structure of neuron **D**. (5)

ACTIVITY 11 *(FS 2024 Sep)*

11.1. The diagram below represents the type of the neuron found in the human body.



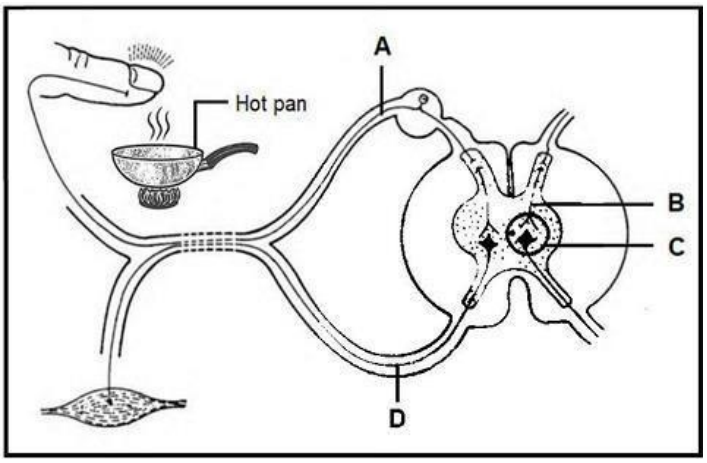
11.1.2. Identify the neuron above (1)

11.1.3. Explain how the speed of transmission of impulses will differ for neuron 1 and neuron 2 (3)

(4)

ACTIVITY 12 (MP 2024 Sep)

12.1. The diagram below represents a reflex arc.



12.1.1. Define a *reflex arc* (1)

12.1.2. Identify the:

(a) Functional connection at **C** (1)

(b) Type of neuron at **B** (1)

12.1.3. State TWO significance of the connection mentioned in **QUESTION** 16.2(a). (2)

12.1.4. Name the neurons as they occur, in the correct sequence, from receptor to effector. (2)

12.1.5. Explain the consequences of a reflex action if neuron **D** is damaged. (2)

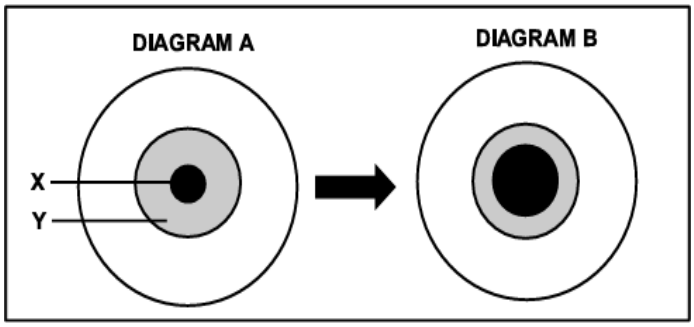
12.1.6. Draw a labelled diagram to represent the structure of neuron **A**. (2)

(11)

CONTENT	ELABORATION
Human eye	❑ Structure and functions of the parts of the human eye, using a diagram ❑ Binocular vision and its importance ❑ The changes that occur in the human eye for each of the following, using diagrams: • Accommodation • Pupillary mechanism ❑ The nature and treatment of the following visual defects, using diagrams: • Short-sightedness • Long-sightedness • Astigmatism • Cataracts
Human ear	❑ Structure of the human ear and the functions of the different parts, using a diagram ❑ Functioning of the human ear in: • Hearing (include the role of the organ of Corti, without details of its structure) • Balance (include the role of maculae and cristae, without details of their structure) ❑ Cause and treatment of the following hearing defects: • Middle ear infection (the use of grommets) • Deafness (the use of hearing aids and cochlear implants)

ACTIVITY 13 (*National 2024 Nov)*

13.1. The diagrams below represent the pupillary mechanism in the human eye



13.1.1. Identify part

(a) X (1)

(b) Y (1)

13.1.2. Explain why the pupillary mechanism is considered to be a reflex action. (3)

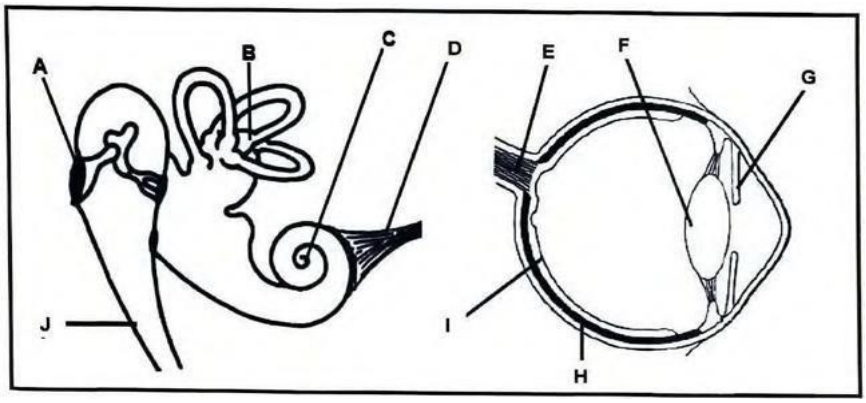
13.1.3 Name the TWO effector muscles that are involved in the pupillary mechanism. (2)

13.1.4. Explain the significance of the change in the diameter of part X from diagram A to diagram B (4)

(11)

ACTIVITY 14 *(KZN SEP 2024)*

14.1. The diagram below shows parts of a human ear and a human eye.



14.1.1 Write down TWO LETTERS only of the parts that:

(a) Carry impulse (2)

(b) Contain receptors (2)

14.1.2 State ONE function of parts:

(a) G (1)

(b) **H** (1)

(c) J (1)

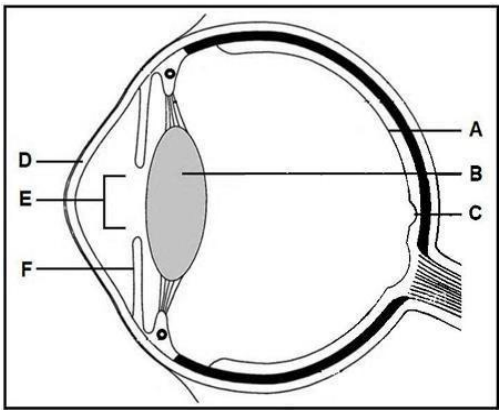
14.1.3 Miss Candice Ndlovu walked into a hall with a wet floor without knowing. She heard a loud voice from the helping lady "it's wet ... " and she slipped and almost fell.

14.1.4. Describe the role of part(s):

(a) in maintaining balance in Miss Candice Ndlovu (3)
(b) to in enabling her to hear (5)
(15)

ACTIVITY 15 *(MP 2024 Sep)*

15.1 The diagram below shows a section of a human eye.



15.1.1 Give the LETTER and the NAME of the region where the clearest image is formed. (2)

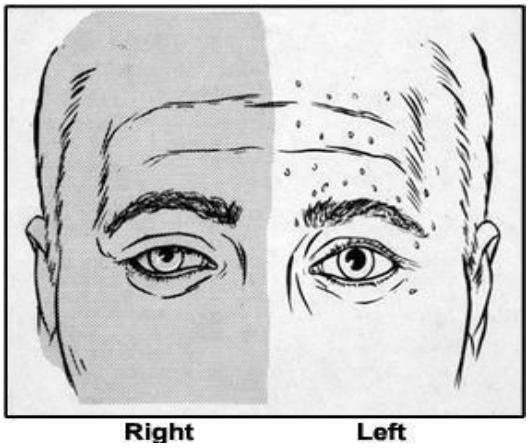
15.1.2 Using the LETTER and NAME, give the correct sequence through which light travels until it reaches part C. (3)

15.1.3 Name and describe the changes that occur in the structures labelled E, and F when watching a movie in the cinema. (7)
(12)

Activity 16 *(Sep GP 2023)*

16.1

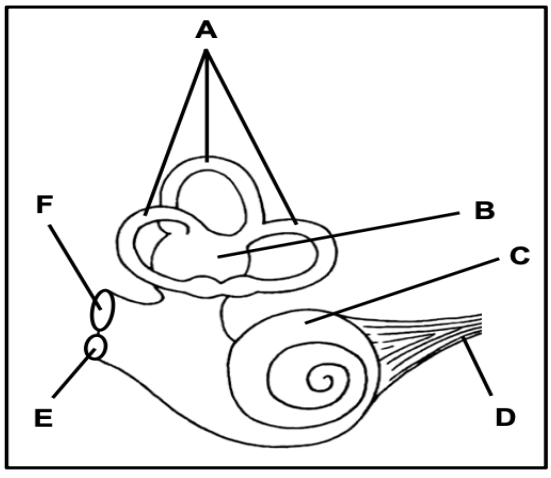
Horner syndrome (Oculosympathetic palsy) is a condition that negatively affects parts of the sympathetic nervous response in the face and eye on one side of the body and is caused by a disruptive nerve in the brain. This condition may lead to decreased pupil size, a drooping eyelid and decreased sweating 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).



16.1.1 Which side of the face shown above is affected by Horner syndrome? (1)
16.1.2 Give ONE reason for your answer in QUESTION 16.1.1 by referring to the text and the diagram. (1)
16.1.3 Name the part of the brain which interprets what you see. (1)
16.1.4 Name the part of the nervous system which controls the pupillary reflex. (1)
16.1.5 Describe the risk that the decreased pupil size in Horner syndrome may pose to a driver at night. (2)
16.1.6 Tabulate TWO differences between the functions of adrenalin and the parasympathetic nervous system. (5)
16.1.7 Name and describe the process which allows a person with Horner syndrome to focus dearly on an object which was far away and is now less than 6 m from them (4)
(15)

Activity 17 *(DBE May/June 2026)*

17.1 The diagram below shows the structure of the inner ear.



17.1.1. Identify part:

(a) **A** (1)

(b) **D** (1)

17.1.2 Give the LETTER and NAME of the part that:

(a) Receives vibrations from the middle ear (2)

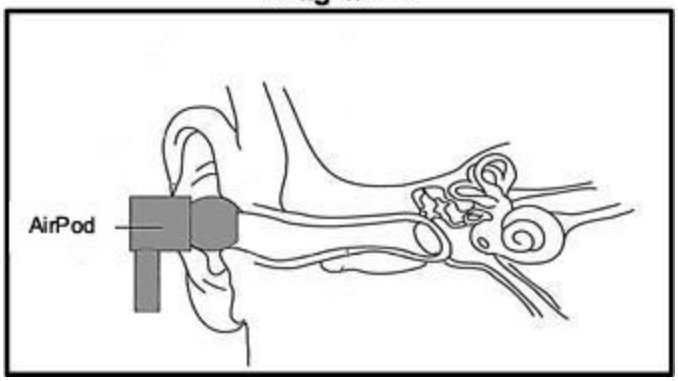
(b) Contains the organ of Corti (2)

(6)

Activity 18 *(GP 2024 Sep)*

18.1 AirPods are wireless listening devices that fit into the ear and direct sound, all users to listen to music from their phones privately without disturbing others.

Diagram 1



A smartphone has a feature that can monitor the volume of music being played through the AirPods and give warning notifications if the volume exceeds 80 dB (decibels).

Fred and Tebogo are listening to the same music. Diagrams 2 and 3 below show their phone displays.

Diagram 2

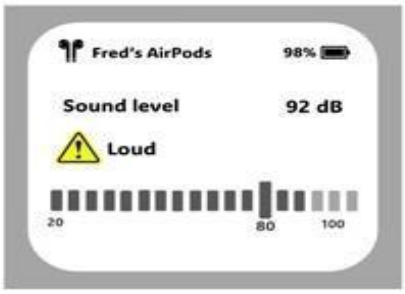


Diagram 3



18.1.1 Name the part of the ear that:

(a) Vibrates due to the direct effect of sound waves (1)

(b) Contains receptor cells which detect the sound stimulus (1)

(c) Equalises pressure in the middle ear (1)

(d) Channels sound waves to the middle ear (1)

18.1.2 Explain TWO ways in which AirPods could prevent a person from hearing other environmental noise. (2)

18.1.3 Use diagrams 2 and 3 and answer the following questions.

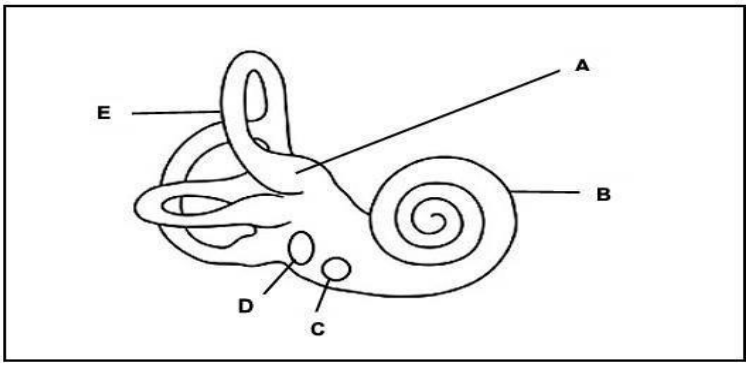
(b) Who is more at risk for damage to their sound receptor cells? (1)

(c) Explain your answer to QUESTION 29.1. (a). (2)

(11)

Activity 19 *(EC Sep 2024)*

19.1. The diagram below shows the structure of the inner ear.



19.1.1 Give the LETTER and NAME of the part that:

(a) Collects vibrations from ossicles and converts them into pressure waves (2)

(b) Contains the organ of Corti (2)

19.1.2 Top ice-figure skaters can spin up to six **revolutions** on their body's axis per second

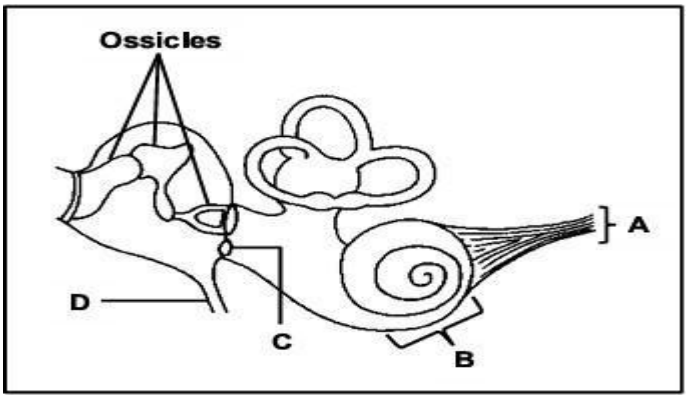


19.3 Describe the role of part A in the maintenance of balance of their body while spinning. (4)

(10)

Activity 20 *(NSC Jun 2024)*

20.1 The diagram below represents parts of the human ear



20.1.1 Identify part:

(a) A (1)

(b) B (1)

20.1.2 State the function of part:

(a) **C** (2)

(b) **D** (2)

20.1.3 Describe the role of the ear in maintaining balance. (6)

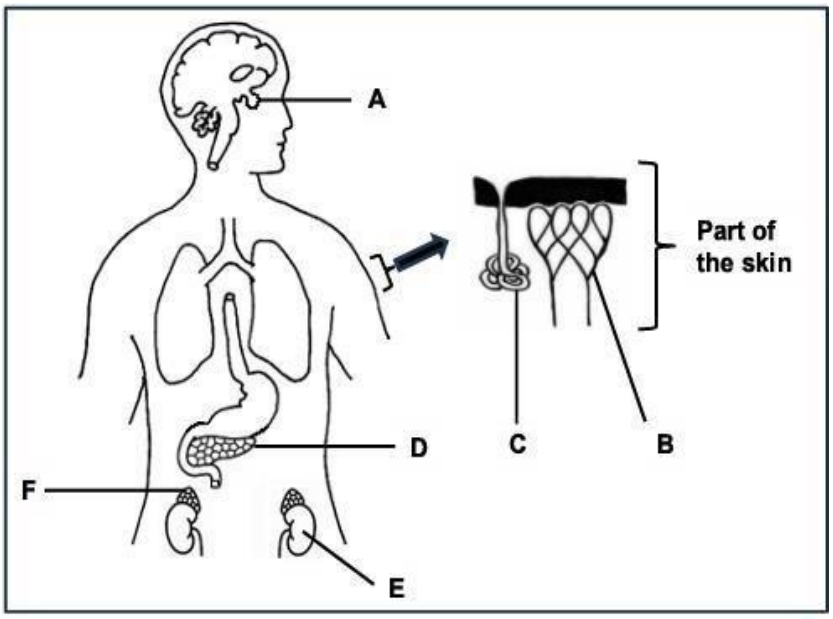
(12)

ENDOCRINE SYSTEM AND HOMEOSTASIS Paper 1: 34 marks	Term 2 and 3	2½ weeks

CONTENT	ELABORATION
Endocrine system	❑ Difference between an endocrine and an exocrine gland ❑ Definition of a hormone ❑ Location of each of the following glands, using a diagram, the hormones they secrete and function(s) of each hormone: • Hypothalamus (ADH) • Pituitary/Hypophysis (GH, TSH, FSH, LH, prolactin) • Thyroid glands (thyroxin) • Islets of Langerhans in the pancreas (insulin, glucagon) • Adrenal glands (adrenalin, aldosterone) • Ovary (oestrogen, progesterone) • Testis (testosterone)
Introduction – Homeostasis	❑ Homeostasis as the process of maintaining a constant, internal environment within narrow limits, despite changes that take place internally and externally. ❑ The conditions within cells depend on the conditions within the internal environment (the tissue fluid) ❑ Factors such as carbon dioxide, glucose, salt, water concentration, temperature and pH must be kept constant in the internal environment (tissue fluid)
Homeostasis: Negative feedback mechanisms	❑ Negative feedback mechanism controlling each of the following in the body: • Thyroxin levels • Blood glucose levels • Blood carbon dioxide levels • Water balance (osmoregulation) • Salt ❑ Disorders caused by an imbalance in levels of: • Thyroxin – Goitre • Blood glucose – Diabetes mellitus

Activity 21 *(Nov 2024 SA)*

21.1 The diagram below represents some structures involved in homeostasis in t human body.



21.1.1 Write the LETTERS of the parts that serve as endocrine glands only. (2)

21.1.2 Give the LETTERS and NAMES of the parts responsible for the regulation of body temperature. (4)

21.1.3 Name the following with regard to the regulation of water content in the blood

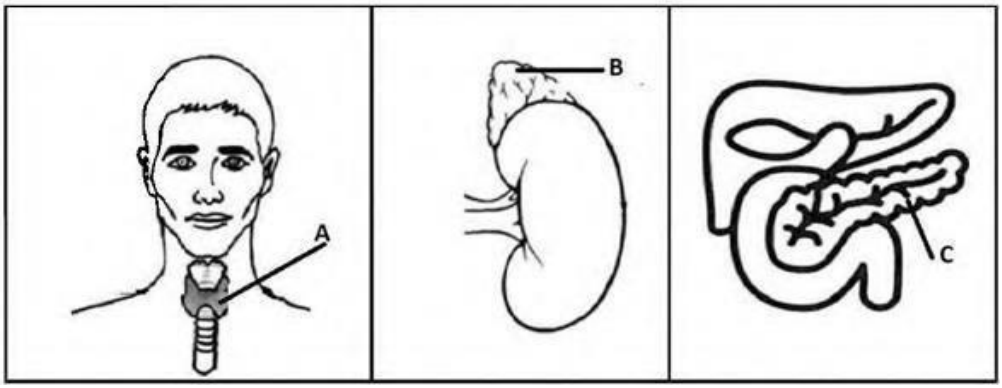
(a) Hormone secreted by part A (1)

(b) Target organ E (1)

(8)

Activity 2 2 *(WC2024Sep)*

22.1 Study the following diagrams, representing endocrine glands in the human body.



22.1.1 Identify the endocrine glands labelled:
(a) **A** (1)
(b) **B** (1)
(c) **C** (1)

22.1.2 The functioning of the gland in diagram **A** is controlled by another hormone.
Provide the name of this hormone. (1)

22.1.3 Name the gland responsible for the secretion of the hormone identified in QUESTION 22.1.1.. (a). (1)

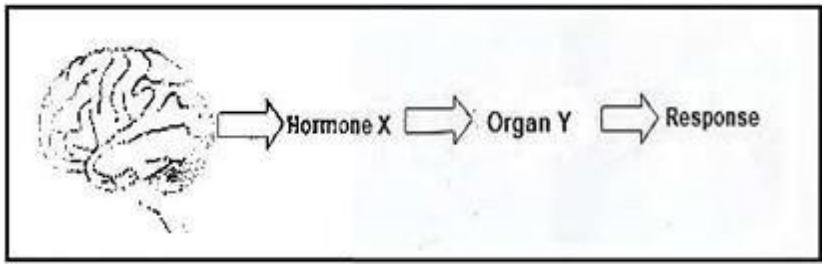
22.1.4 Name the type of interaction between the gland in diagram **A** and the gland mentioned in QUESTION 4.2 (b). (1)

22.1.5 Name the hormone secreted by the gland B, that is responsible for the 'flight or fight' reaction. (1)

22.1.6 Name the hormone secreted by the endocrine gland C, when the blood glucose levels are low. (1)

Activity 2 3 *(LIM Sep 2024)*

23.1 The diagram below represents a homeostatic response that occurs when a person is dehydrated. The decrease in blood volume, as a result of the excessive loss of water, is detected by the brain



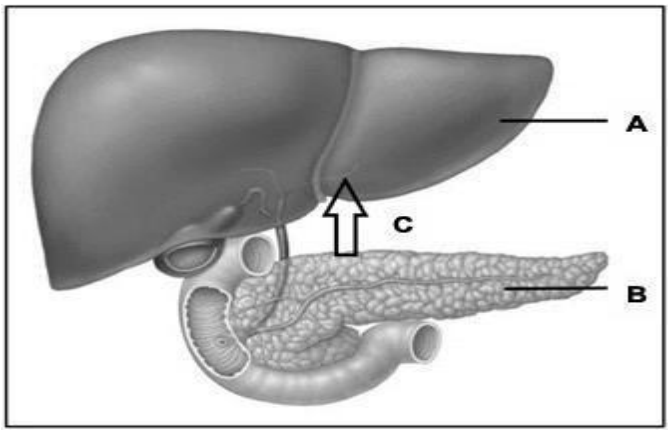
23.1.1. Define the term homeostasis. (2)

23.1.2 Identify:
(a) Hormone X (1)
(b) Target organ Y (1)

23.1.3 Describe what happens when the Carbon dioxide level in the blood increases above normal (5)
(9)

Activity 24 *(Sep GP 2023)*

24.1 The diagram below shows an endocrine gland involved in regulating blood glucose levels. It shows the hormone it releases when blood glucose levels are high and one of the target organs of the hormone.



24.1.1 Identify the following:

(b) Organ A and B (2)

(c) What is a hormone? (1)

24.1.2 Explain how a lack of hormone C affects blood glucose levels. (3)

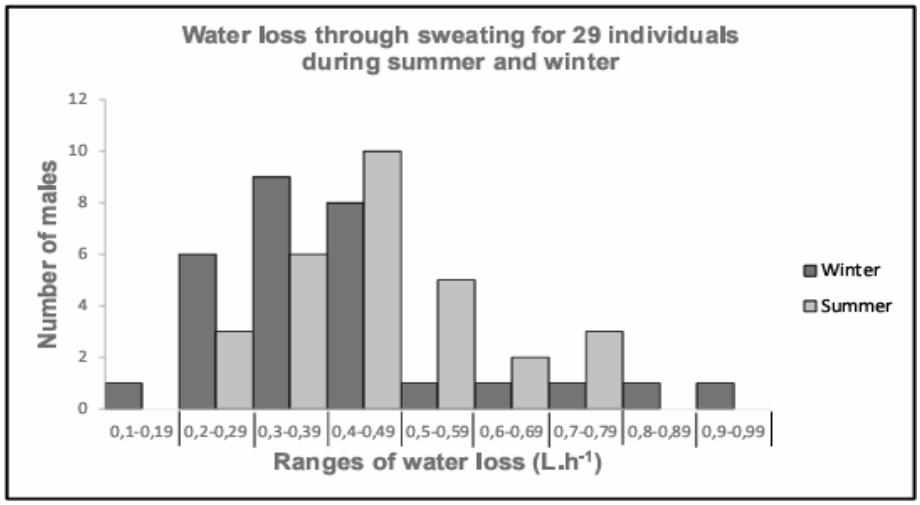
24.1.3 List THREE other hormones that can directly or indirectly affect blood glucose levels. (3)

(9)

Activity 25 *Sep GP 2023)*

25.1.

Scientists found that high sweat rates over prolonged work periods (8 to 12 hour- shifts) in the heat leads to water levels in the blood decreasing below normal. This eventually leads to dehydration, which causes reduced mental and physical performance and may pose a serious risk to health. Scientists therefore carried out an investigation to determine the amount of sweat that an individual experiences during manual labour/exercise in summer and winter. The subjects were 29 healthy, male, outdoor, manual workers (various trades) aged between 18 and 50 years. All agreed to participate in the study. Male subjects exercised in a temperature-controlled room on two consecutive days under both winter and summer conditions. Sweat collecting devices were attached to the upper arms and legs. They found that the average water loss through sweating for the group was 0,47 litres per hour (L.h-1) in the summer compared with 0,41 litres per hour (L.h-1) in winter. The graph below shows the number of males that fall into the different ranges of water loss, under summer and winter conditions



25.1.1. Use the text provided and state ONE effect of dehydration on the body. (1)

25.1.2 Give the water loss range that the largest number of males fell into under summer conditions (1)

25.1.3 Describe how the body of a healthy person will try to prevent dehydration when the water levels in the blood decrease to below normal. (5)

25.1.4 Explain how the change in the average water loss through sweating, from winter to summer, affects body temperature (4)

25.1.5 Suggest TWO ways in which a company can decrease the risk of dehydration for their workers (2)
(13)

Activity 26 *(DBE May/June 2026)*

26.1

HYPOTHYROIDISM IN CHILDREN

Hypothyroidism is a condition where the thyroid gland does not secrete enough thyroxin.

In a study, 265 children with hypothyroidism were checked for other effects and disorders.

The results showed that the most common effects included short stature (33%), loss of appetite (16%), weight gain (14%), tiredness (12%) and goitre (3%). Disorders included a vitamin D deficiency (37%), diabetes mellitus (22,3%) and Down syndrome (8,3%).

26.1.1 State ONE function of thyroxin. (1)

26.1.2 According to the extract, which effect is most common among children with hypothyroidism? (1)

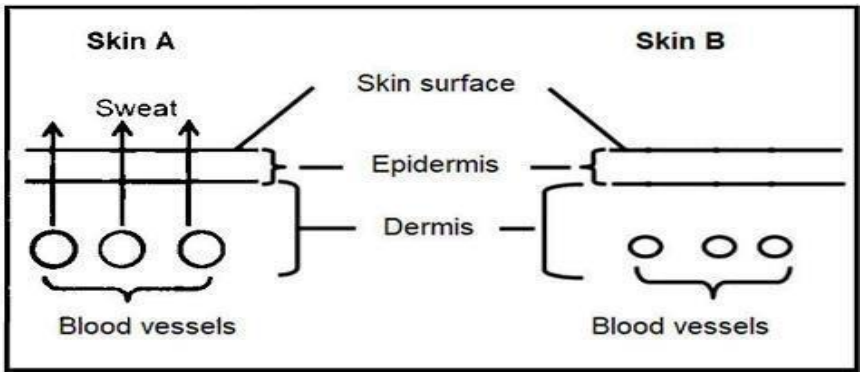
26.1.3 Calculate the number of children in the group that had diabetes mellitus. Show ALL your working and round off the answer to ONE decimal place (3)

26.1.4. Apart from testing the thyroxin levels in the blood, explain why doctor may also test the TSH levels in the blood of children with hypothyroidism (2)

(7)

Activity 27 (*MP Sept 2024)*

27.1 Study the diagram below and answer the questions that follow



27.1.1 Which is the environmental condition that resulted in appearance of skin **B**? (1)

27.1.2 Describe the process that is taking place in skin **A** in order to maintain a constant body temperature. (3)

27.1.3 Explain why sweating plays an important role in maintaining body temperature, when the environmental temperature increases (3)

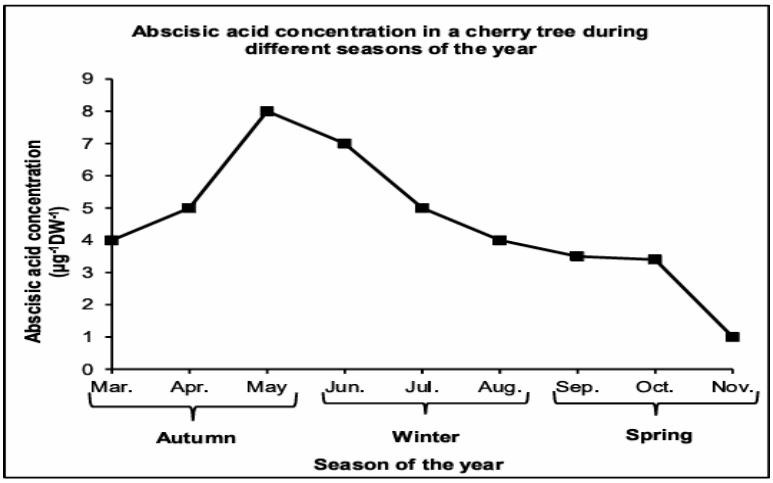
(17)

RESPONDING TO THE ENVIRONMENT (PLANTS) Paper 1: 13 marks	Term 3	1 week

CONTENT	ELABORATION
Plant hormones	❑ General functions of the following: • Auxins • Gibberellins • Abscisic acid ❑ The control of weeds using plant hormones ❑ The role of auxins in: • Geotropism • Phototropism
Plant defence mechanisms	❑ Role of the following as plant defence mechanisms: • Chemicals • Thorns

Activity 28 *(NSC Jun 2023)*

The graph below shows the concentration of abscisic acid in a cherry tree during different seasons of the year. This tree species loses all its leaves in autumn and goes into a state of dormancy during the winter months



28.1.1 During which month was the abscisic acid concentration the lowest? (1)

28.1.2 Explain the trend of the graph from March to May. (3)

28.1.3 Suggest ONE reason for the dormancy in cherry trees during the winter Months (2)

28.1.4 Geotropism refers to the movement of a part of a plant in response to gravity. This tropism is controlled by auxins.

(b) Describe the role of auxins in roots. (2)

(c) When a plant is placed horizontally, with light coming from all directior the auxins will accumulate on the lower side of both the stem and the roots. (2)

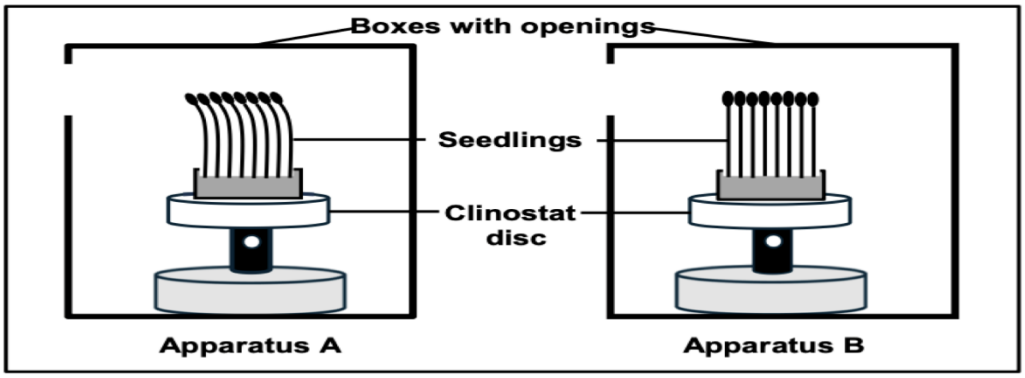
28.1.5 Explain the difference in the response of the stem and the roots after a few days. (2)

Activity 29 *(DBE May/June 2025)*

29.1. An investigation was conducted to determine the response of plant seedlings to light

- Grain seeds were allowed to germinate into seedlings.
- One half of the seedlings were planted in one small pot and the other half in another small pot.
- When the stems reached a height of approximately 1 cm, the pots were placed on the discs of two clinostats. A clinostat is an apparatus consisting of a slowly rotating disc when switched on.
- Both sets of apparatus (**A** and **B**) were placed inside boxes with openings on one side only for light to enter (unilateral light).
- One clinostat was switched on and the other one was switched off.
- The apparatus was left for two weeks.

The results after two weeks are represented in the diagram below.



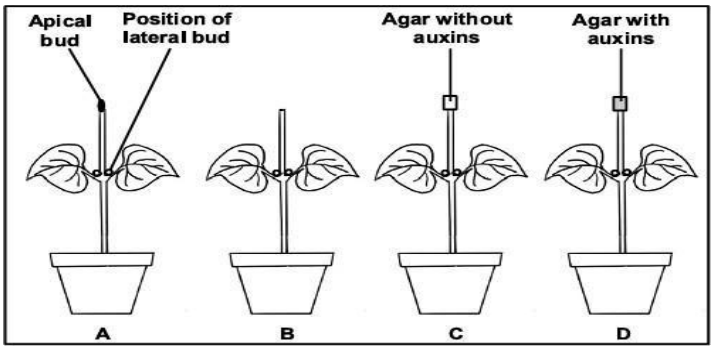
29.1.1. Identify the plant growth response demonstrated by the results. (1)
29.1.2. In which apparatus (**A** or **B**) was the clinostat switched on and the disc rotating slowly? (1)
29.1.3. Explain your answer to QUESTION 29.1.2 (2)
29.1.4. Explain the growth response of the seedlings in apparatus **A**. (5)

Activity 30 *(DBE/November 2023)*

30.1. 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

For this investigation state the:

30.1.1. (a) Independent variable (1)

(b) Dependent variable (1)

30.1.2. Explain why all the plants were exposed to the same environmental conditions. (2)

30.1.3. Explain why agar without auxins was used in plant C. (3)

30.1.4 State a conclusion for this investigation. (2)

(9)

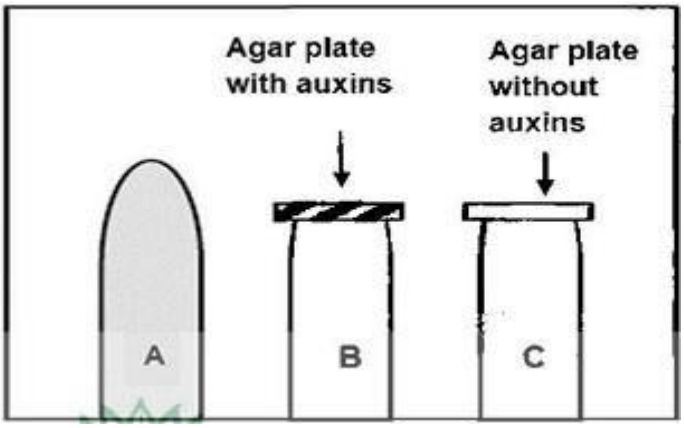
Activity 31 *LIMPOPO DoE/ Sep 2024*

31.1. Dale did an investigation to determine the effect of auxins on the growth of three plant shoots (**A**, **B** and **C**). The plant shoots were treated as follows:

- Shoot **A** - Tip of the shoot was not removed
- Shoot **B** - Tip removed and an agar plate with auxins placed on top
- Shoot **C**- Tip removed and agar plate without auxins placed on top (Agar is a jelly-like substance that allows auxins to diffuse through it)

All shoots were exposed to the same light conditions.

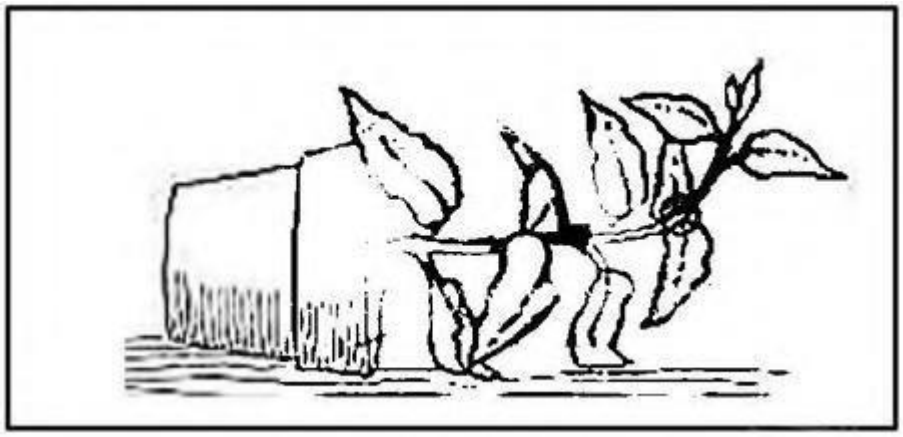
The diagram below indicates the set-up at the beginning of the investigation.



31.1.1. Explain the results as observed in:
(b) Shoot **B** after a few days (4)
(c) Shoot **C** after few days (3)
31.1.2. State TWO factors that must be kept constant in this investigation.
31.1.3. State TWO ways in which Dale could have improved the reliability investigation.

Activity 32 *(WC Sep 2024)*

32.1. A pot plant was placed onto its side in a dark box. After 2 weeks, the stem started to grow upwards.



32.1.1. Name the growth response which is indicated by the stem's upward growth (1)
32.1.2. Name the plant hormone which is responsible for the stem's upward growth. (1)
32.1.3. Explain the growth response observed in the stem. (4)
32.1.4. Explain ONE way in which the stems upward growth benefits the plant (2)

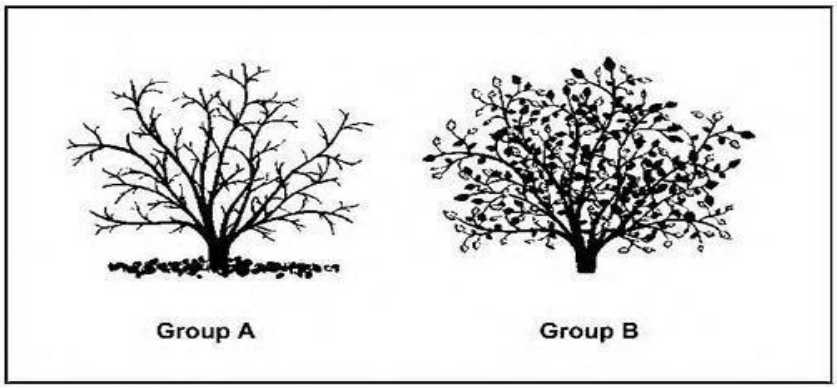
(8)

Activity 33 *NW/September 2024*

33.1. The Grade 12 learners investigated the effect of abscisic acid on plant dormancy. The procedure was as follows:

- A greenhouse was set up with a constant temperature of 28 C and 30% humidity level.
- pear trees of similar age and size were placed in the greenhouse.
- The trees were divided into group **A** and group **B** with 8 trees in each group.
- In group **A**, the 8 trees were treated with abscisic acid for 5 days.
- In group **B**, the 8 trees were treated with water only for 5 days.
- The shedding of leaves by the plants was observed.
- The learners recorded their observations for seven days.

The diagram below shows the observation made at the end of the seven days. The diagram does NOT represent all the trees that were investigated nor the actual size of the trees.



33.1.1. State the aim of the investigation. (1)

33.1.2. Identify the following:

(b) Independent variable. (1)

(c) Dependent variable. (1)

(d) ONE controlled variable. (1)

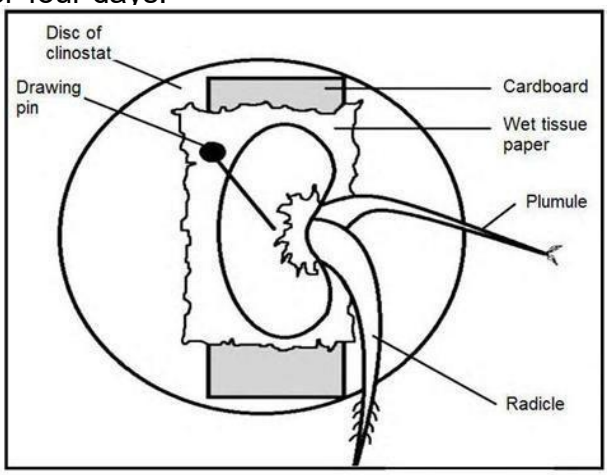
33.1.3. What is meant by abscission? (1)

33.1.4. State TWO other functions of abscisic acid in plants. (2)

(7)

Activity 34 *MDE/September 2024*

34.1. An experiment was conducted to investigate the direction of plumule growth when the germinating seed was placed vertically on a stationary clinostat as shown in the diagram below. The growing tips of the germinating seed were exposed to light from all directions. The wet tissue paper was periodically sprayed with water to keep the seed moist. The seed was kept in this position for four days. The tip of plumule began to bend and grew in an upward direction after four days.



34.1.1. Name the hormone that controls the direction of plumule growth in a germinating seed. (1)

34.1.2. Give a reason for exposing the germinating seed to light from all directions. (1)

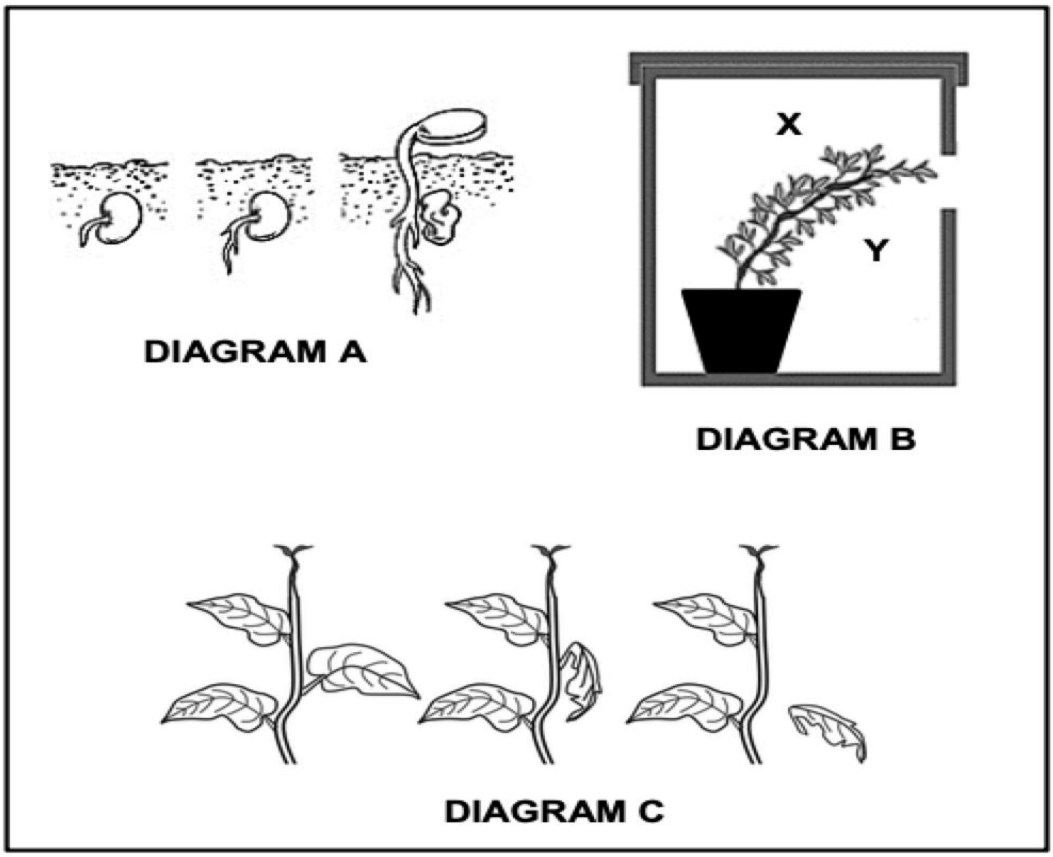
34.1.3. Explain the direction of plumule growth as observed after four days. (3)

34.1.4. How does the control differ from the experiment? (1)

(6)

ACTIVITY 35 *(Nov 2025)*

35.1The diagrams below represent different plant responses caused by hormones.



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

(a) Abscisic acid (1)
(b) Auxins (2)
(c) Gibberellins (1)

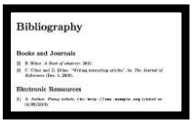
35.1.2. Identify the growth response shown:

(a) By the roots in diagram **A** (1
(b) In diagram **B** (1)

35.1.3. 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)



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8	Limpopo/September 2024
9	KZN/September 2024
10	FS/September 2023
11	NW/September 2023
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