Province of the
EASTERN CAPE
EDUCATION



NATIONAL SENIOR CERTIFICATE

GRADE 12



SEPTEMBER 2022

LIFE SCIENCES P1

MARKS: 150

TIME: 2½ hours

LFSCE1

This question paper consists of 16 pages.

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, for example 1.1.11 D.

1.1.1 Which ONE of the following parts collects sound waves?

A Pinna
B Tympanic membrane
C Auditory canal
D Eustachian tube

1.1.2 A device used to treat a middle ear infection is a …

A grommet.
B cochlear implant.
C hearing aid.
D biconcave lens.

1.1.3 Which ONE of the following represents the correct sequence in the transmission of a sound stimulus in the ear?

A Vibration → sound wave → pressure wave → impulse
B Sound wave → vibration → pressure wave → impulse
C Impulse → pressure wave → vibration → sound wave
D Sound wave → impulse → pressure wave → vibration

1.1.4 Which ONE of the following visual defects occurs when the lens of an eye becomes cloudy and opaque?

A Long-sightedness
B Short-sightedness
C Astigmatism
D Cataracts

1.1.5 The layer of the eye that is richly supplied with blood vessels is the …

A retina.
B sclera.
C conjunctiva.
D choroid.

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1.1.6 A structure in a male reproductive system that transports both semen and urine is the …

A epididymis.
B vas deferens.
C urethra.
D seminiferous tubule.

1.1.7 The hormone that stimulates the development of the endometrium is …

A FSH.
B LH.
C testosterone.
D oestrogen.

1.1.8 The process whereby an ovum is released from the ovary in humans is known as …

A ovulation.
B oogenesis.
C fertilisation.
D menstruation.

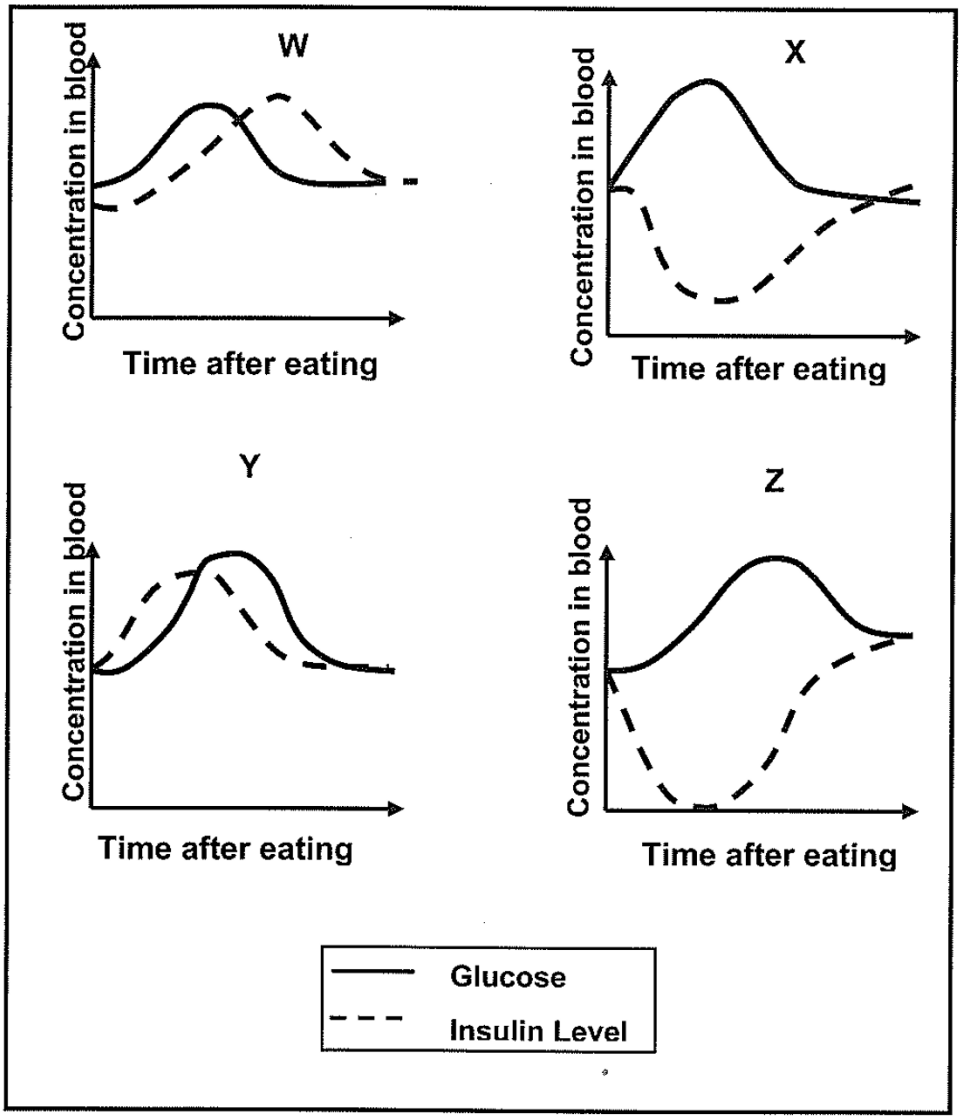
1.1.9 A surgical removal of the prostate gland may decrease the chances of reproduction in males because …

A sperm cells can die in the acidic conditions of the vagina.
B sperm cells produced will be abnormal and unable to move.
C no sperm cells will be released during copulation only semen.
D immature sperm cells will be released into the vagina.



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1.1.10 The graphs below represent possible blood glucose and insulin levels in a person.



Which ONE of the graphs represents the blood glucose and insulin levels of a person without diabetes mellitus after a meal?

A W
B X
C Y
D Z

(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 1.2.10) in the ANSWER BOOK.

1.2.1 A hormone that stimulates milk production in human females

1.2.2 The type of cell division that results in the formation of a morula from a zygote

1.2.3 The path taken by an impulse in bringing about a response to a stimulus during a reflex action

1.2.4 The branch of the peripheral nervous system that consists of sympathetic and parasympathetic nerves

1.2.5 The microscopic gap found between two consecutive neurons



1.2.6 The part of the skull that protects the brain

1.2.7 The period of the development of the foetus

1.2.8 A hormone from the pituitary gland that stimulates the thyroid gland to produce its hormone

1.2.9 The homeostatic control of water levels in the blood

1.2.10 The part of the brain that connects the right and the left hemispheres

(10 x 1) (10)

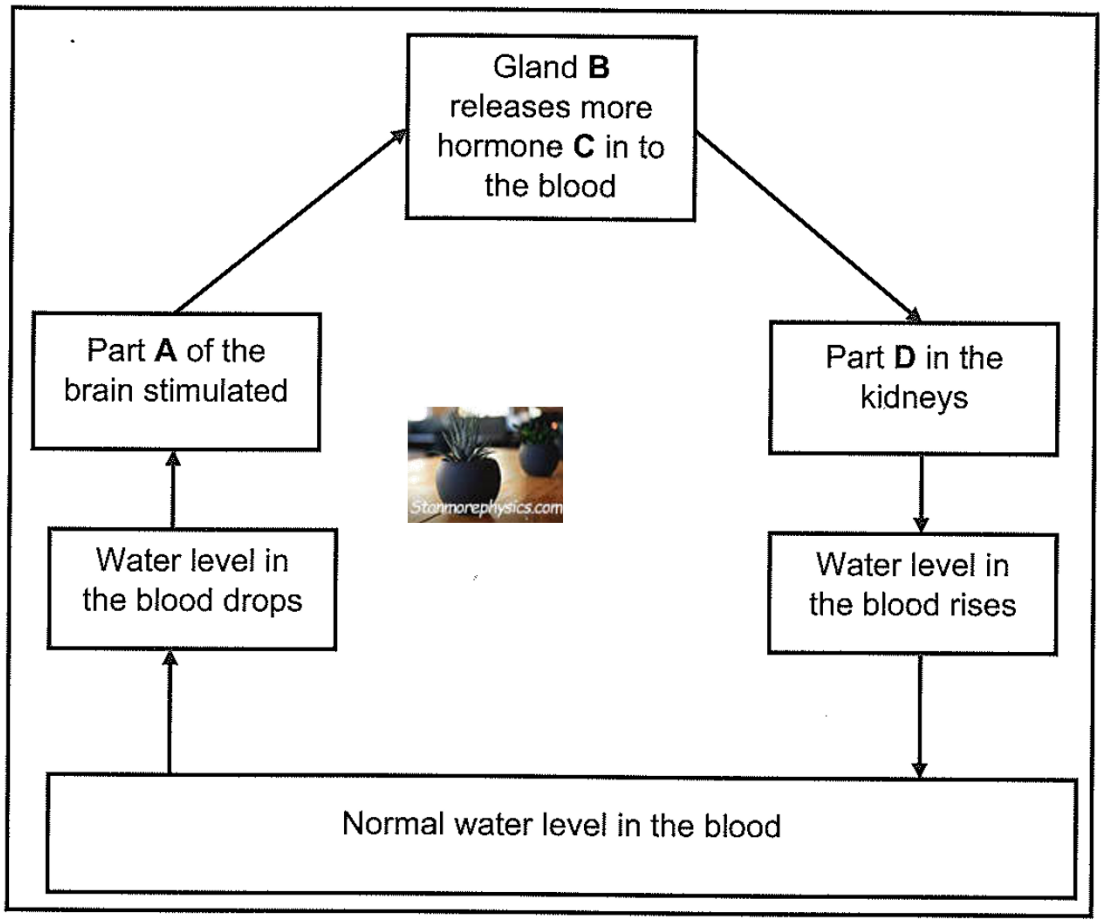
1.3 Indicate whether each of the descriptions in COLUMN I apply to **A ONLY**, **B ONLY**, **BOTH A AND B** or **NONE** of the items in COLUMN II. Write **A only**, **B only, both A and B** or **none,** next to the question numbers (1.3.1 to 1.3.3) in the ANSWER BOOK.

COLUMN I	COLUMN II
1.3.1 A brain disorder that results in memory loss	A: Alzheimer's disease B: Multiple sclerosis
1.3.2 The ability of the eye to change the shape of the lens to focus on the object that is near or distant	A: Pupillary mechanism B: Binocular vision
1.3.3 A part of the ear that connects the middle ear to the pharynx	A: Eustachian tube B: Ossicles

(3 x 2) (6)

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1.4 The diagram represents the homeostatic control of water levels in the blood when a person is dehydrated during a soccer match.



1.4.1 Identify:

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

(b) Gland **B** (1)

(c) Hormone **C** (1)

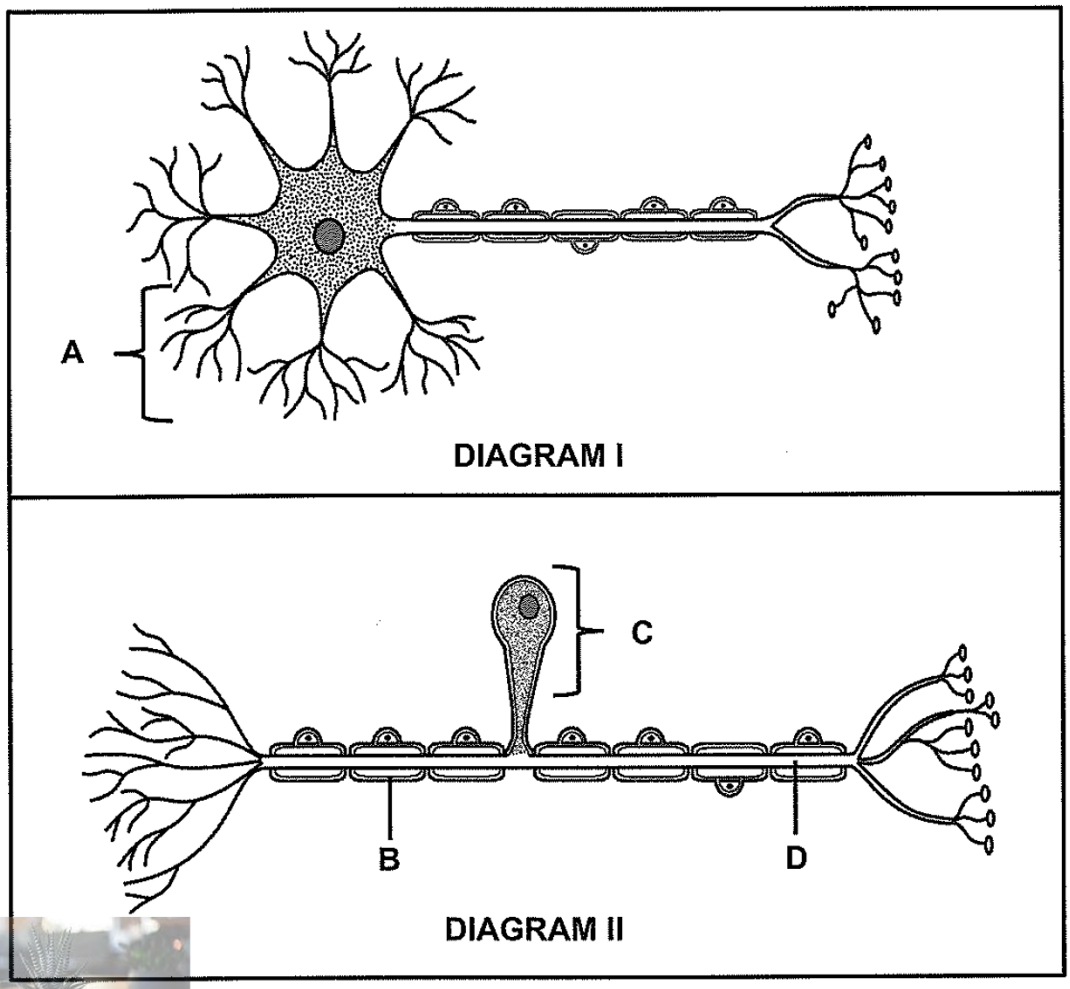
(d) Structure **D** (1)

1.4.2 State the effect of hormone **C** on structure **D** in this person. (1)

1.4.3 Name ONE physiological process that will result in the low levels of water in the blood of this person. (1)

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1.5 The diagram below represents two types of neurons.



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1.5.1 Identify the neuron in:

(a) **DIAGRAM I** (1)

(b) **DIAGRAM II** (1)

1.5.2 Identify part **C**. (1)

1.5.3 Give the LETTER and the NAME of the part that:

(a) Provides electrical insulation (2)

(b) Receives incoming impulses (2)

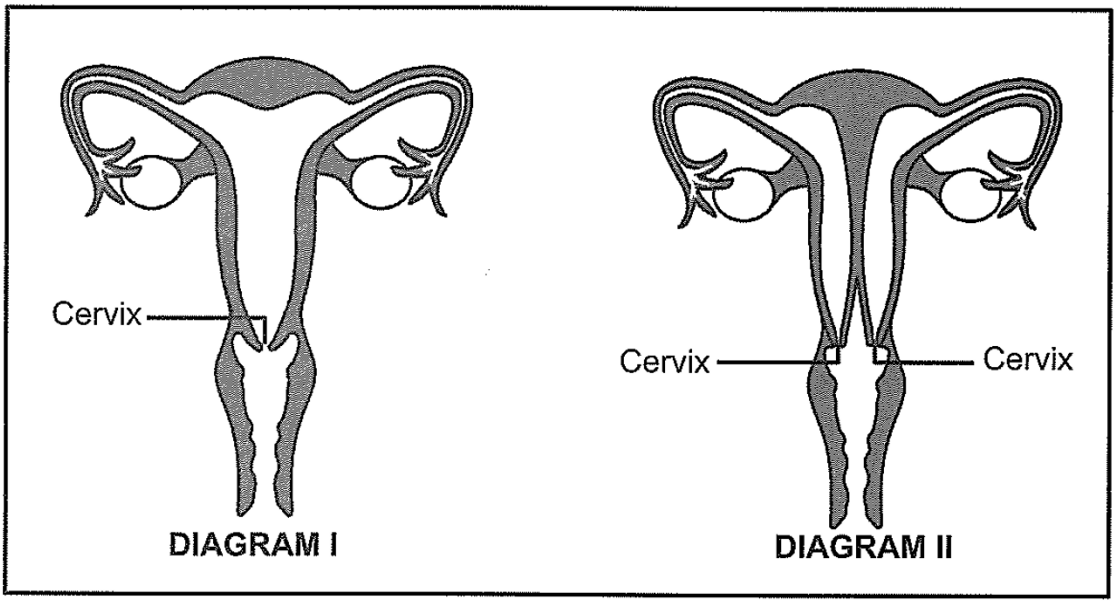
1.5.4 Which neuron (**I** or **II**) transmits impulses to the central nervous system? (1)

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 **DIAGRAM I** shows the structure of a normal female reproductive system and **DIAGRAM II** shows the structure of a female reproductive system with didelphys uterus. Women with didelphys uterus may have a normal pregnancy, but there may be complications in some cases such as ectopic pregnancies, intra-uterine foetal growth restriction, abnormal placentation and foetal malposition.



2.1.1 Tabulate TWO structural differences between the female reproductive systems as shown in **DIAGRAM I** and **DIAGRAM II**. (5)

2.1.2 State TWO possible complications that may occur in a female with didelphys uterus during pregnancy. (2)

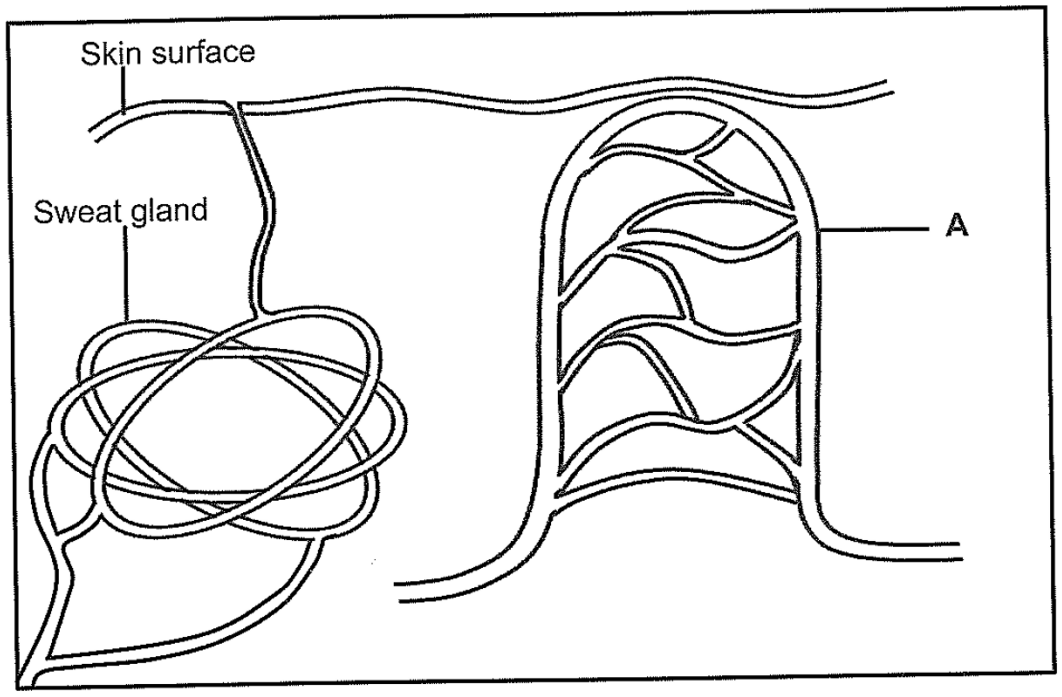
2.1.3 A woman with didelphys uterus is 10 weeks pregnant.

Explain why no other implantation will occur in the second uterus during this time. (4)

2.2 Describe the structures that develop after implantation to ensure protection and nutrition of the developing embryo. (8)

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2.3 The diagram below shows the structures involved in thermoregulation in the skin.



2.3.1 Identify part **A**. (1)

2.3.2 Explain the condition of part **A** on a cold day. (3)

2.3.3 Frostbite is caused by the death of the tissues around the toes when a person is exposed to severe cold conditions for a prolonged period.

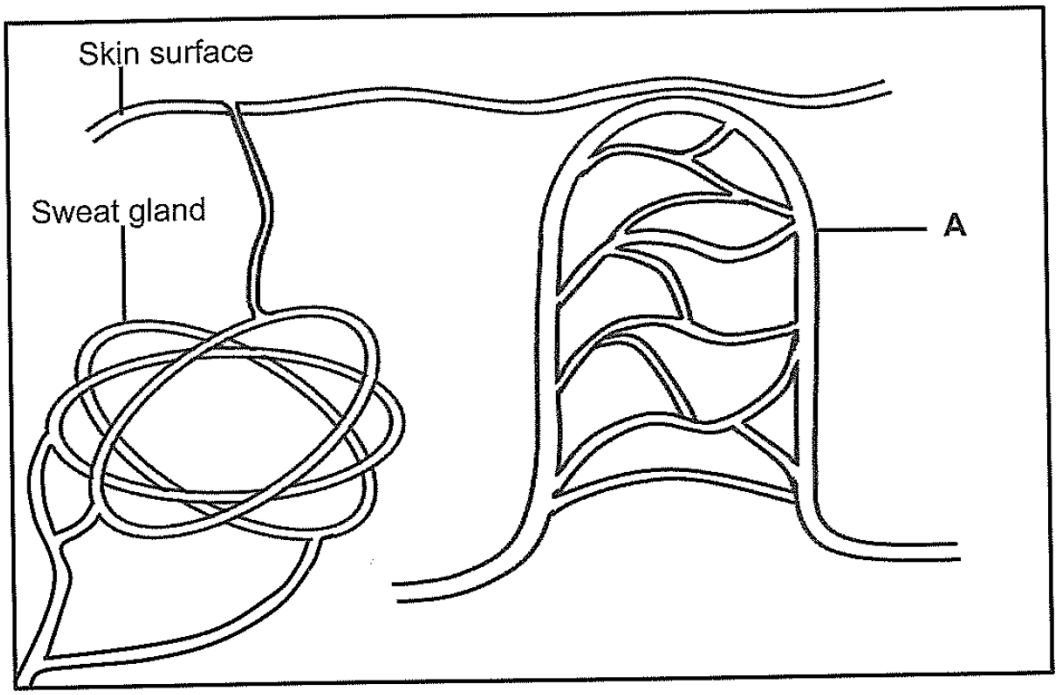
Explain why the condition of part **A** mentioned in QUESTION 2.3.2 may result in frostbite. (3)

2.3.4 Anhidrosis is a condition which results in the sweat glands producing no sweat. It can affect the whole body or a small part of the body. Anhidrosis may be caused by severe burns, radiation, infection, inflammation, or other injuries to the skin.

Explain why anhidrosis affecting the whole body may lead to death, when the person is exposed to very hot conditions for a few hours. (4)

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2.3 The diagram below shows the structures involved in thermoregulation in the skin.



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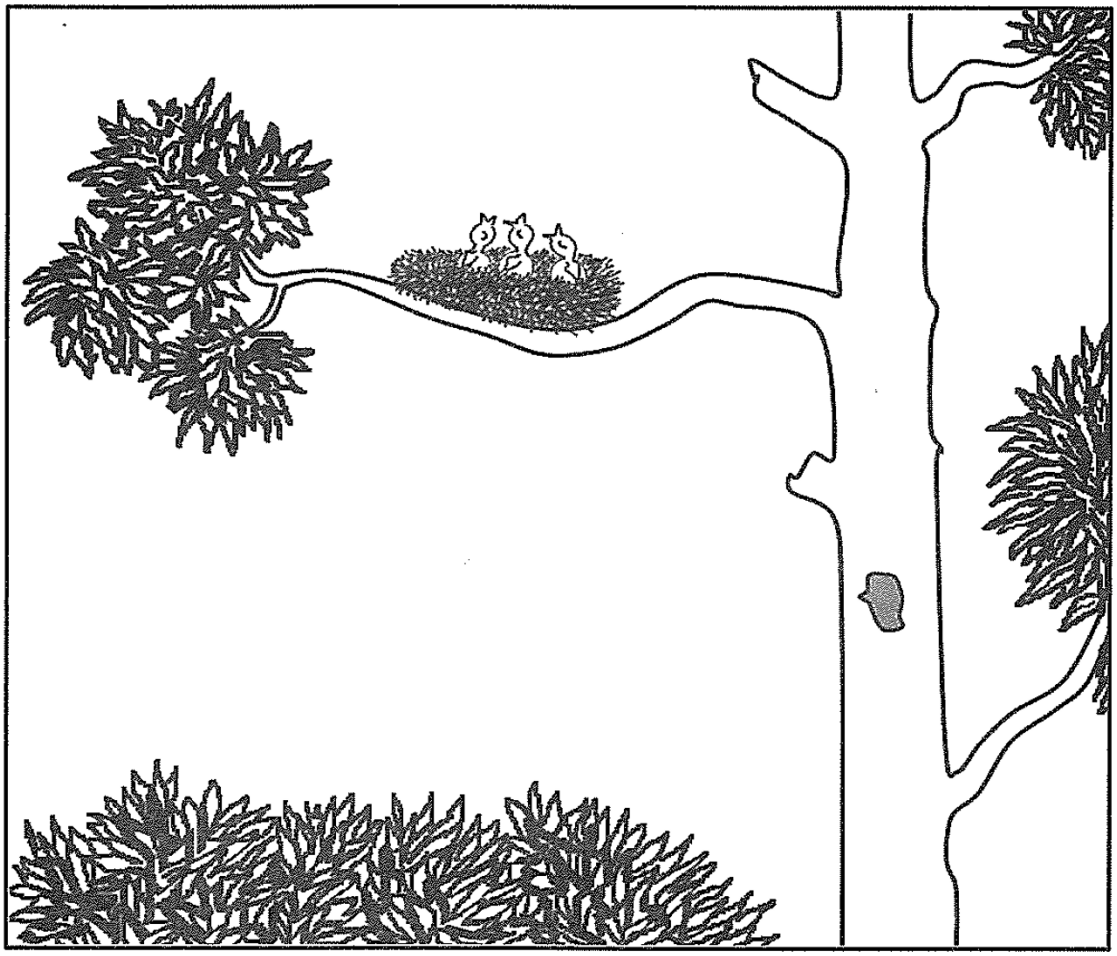
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Explain why anhidrosis affecting the whole body may lead to death, when the person is exposed to very hot conditions for a few hours. (4)

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2.4 The diagram below shows a bird's nest in a high tree with some newly hatched birds.



2.4.1 State TWO observable reasons why this type of development can be regarded as altricial. (2)

2.4.2 Explain ONE advantage of the nest being high in the tree for the altricial development in an ecosystem. (3)

2.4.3 Explain the volume of the yolk in an amniotic egg of the bird that is precocial as compared to the same size of bird that is altricial. (3)

2.5 An investigation was conducted to determine the effect of zinc supplementation on the levels of testosterone in the blood of weightlifting males.

The procedure was as follows:

60 healthy weightlifting males of the same age were asked to participate in the investigation.

- They were given the same diet for 6 weeks
- Their testosterone levels in the blood were measured every day for the 6-week period
- They were given a zinc supplement with their diet every day for 6 weeks
- The testosterone levels in blood were measured again every day
- The average levels of testosterone in blood were calculated before and after the zinc supplement

The average free testosterone per group before and after the investigation is given below:

	Average testosterone in blood (ulU/mL)
Before administering the zinc supplement	16,8
After administering the zinc supplement	22,5

2.5.1 Identify in this investigation the:

(a) Independent variable (1)

(b) Dependent variable (1)

2.5.2 Describe the control that was done for this investigation. (2)

2.5.3 State TWO variables that should have been considered about the zinc supplements to ensure the validity of the investigation. (2)

2.5.4 State TWO ways in which the reliability of the results was ensured for this investigation. (2)

2.5.5 Write a general conclusion that can be drawn from the results obtained. (2)

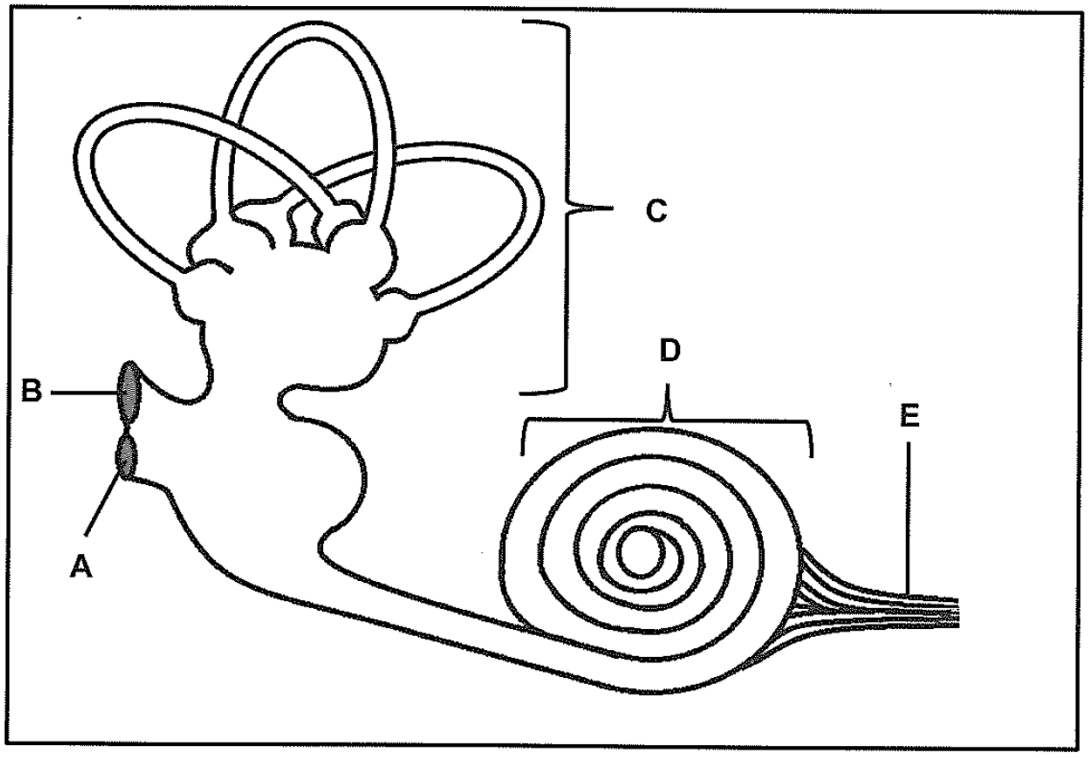
2.5.6 State TWO functions of testosterone in male reproduction. (2)

[50]

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QUESTION 3

3.1 The diagram below shows part of the human ear.



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

3.1.2 State ONE function of part **E**. (1)

3.1.3 State why part **A** must absorb the excess pressure waves. (1)

3.1.4 Describe the how the structures indicated by **C** maintain balance. (7)

3.1.5 Explain why a rupture (hole) in part **B** may lead to hearing loss. (4)

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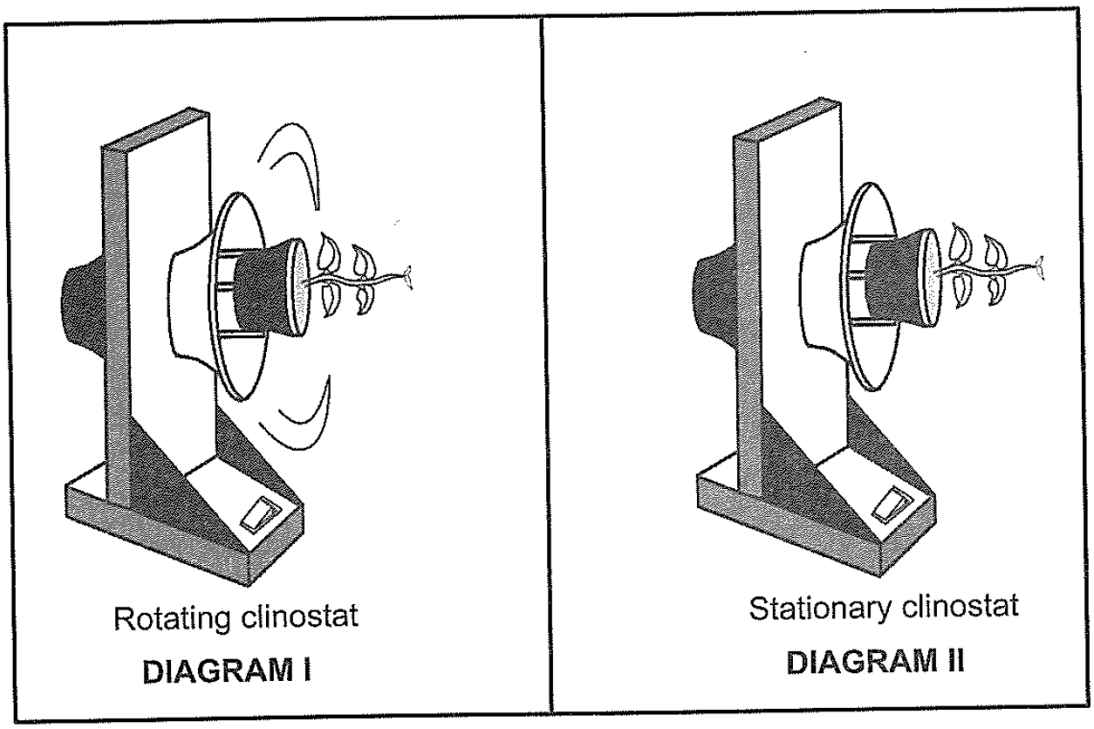
3.2 An investigation was done to determine the effect of gravity on the direction of growth of the stem.

The procedure was as follows:

- Two plants of the same species, height and age were selected
- Plants were exposed to the same environmental conditions (water, nutrients and type of soil)
- Both plants were attached to a clinostat as shown in the diagram
- They were then exposed to light from all directions

The experiments were setup as shown in the diagram below.





Rotating clinostat

DIAGRAM I

Stationary clinostat

DIAGRAM II

3.2.1 Suggest ONE reason why it is important for the stem of the plant to grow towards the light. (1)

3.2.2 What is the term given to the growth movement of a part of a plant in response to gravity? (1)

3.2.3 State the purpose of rotating the clinostat in **DIAGRAM I** during the investigation. (1)

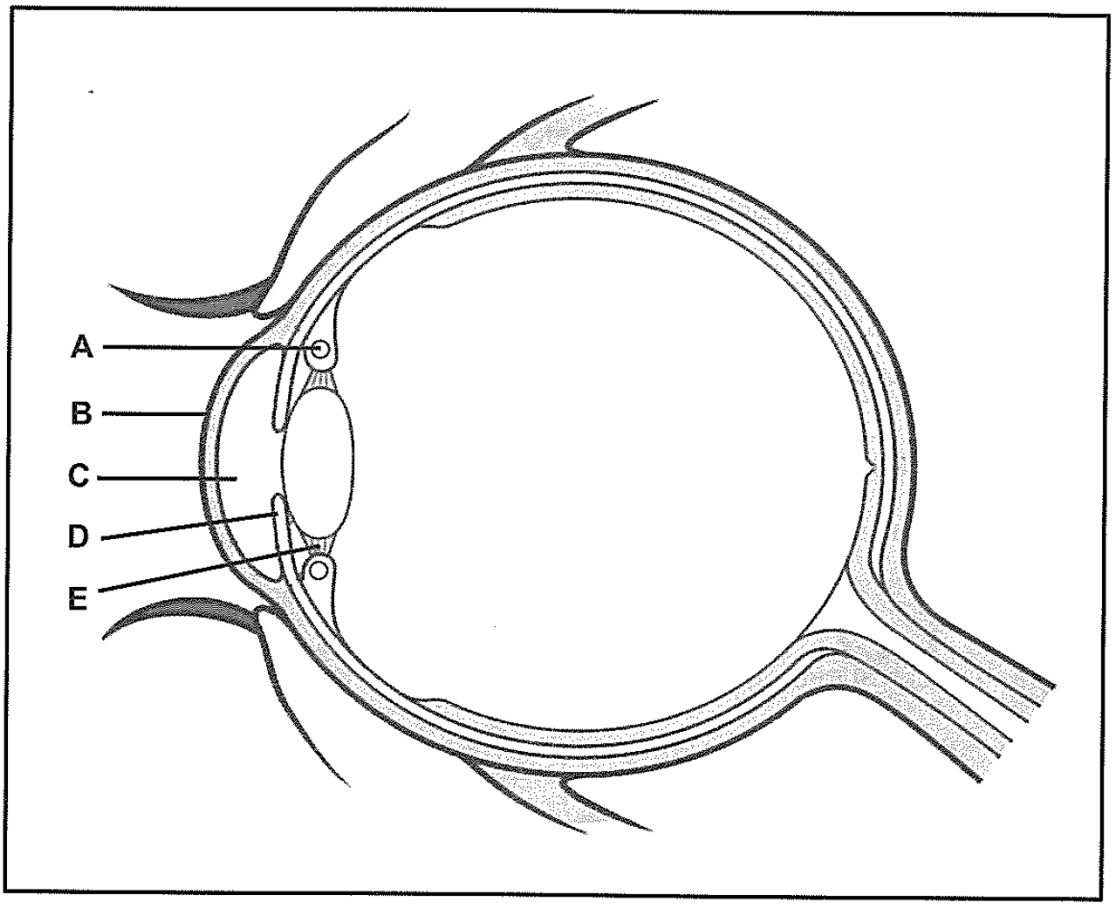
3.2.4 Explain the results that will be obtained after 2 weeks in **DIAGRAM II**. (5)

3.2.5 If the growth tip of the stem in **DIAGRAM I** was removed at the start of the investigation, explain the results that will be obtained after 2 weeks. (4)

3.2.6 Name ONE, other hormone which stimulates the growth of the plant. (1)

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3.3 The diagram below represents the structure of the human eye.



3.3.1 Identify part **B**. (1)

3.3.2 Describe the functioning of part **D** when a person is in dim light. (2)

3.3.3 Explain the role part **A** and **E** when an object is moving closer. (3)

3.3.4 Glaucoma is an eye disease that can lead to blindness. It occurs when the excess aqueous humor cannot leave the eye because the drainage channels in the cornea and iris are blocked. This blockage creates more pressure in the eye which will damage the photoreceptors and the optic nerve.

(a) Give the LETTER that represents the aqueous humor. (1)

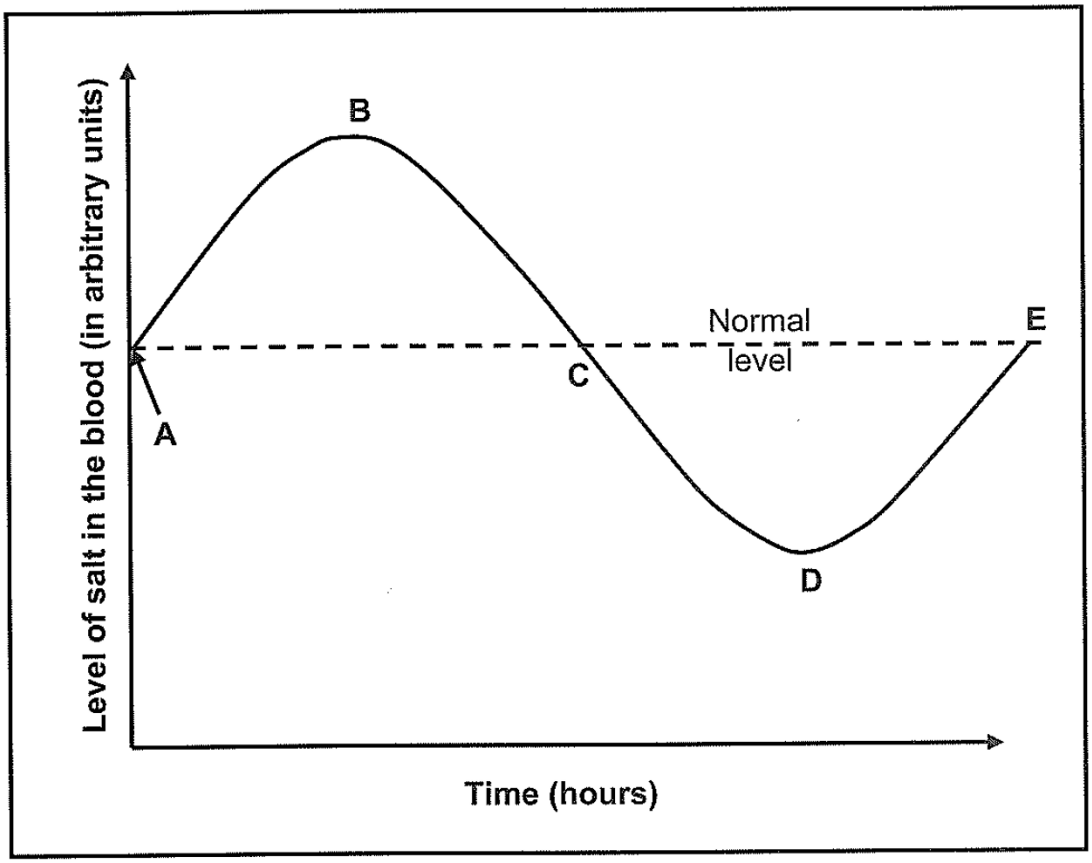
(b) Describe how the pressure in the eye may increase. (2)

(c) Explain why a person with glaucoma may become blind. (3)

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3.4 The graph below represents the homeostatic control of salt levels in the blood of a person.



3.4.1 Name the:

(a) Organ that regulates the salt levels in the blood (1)

(b) Hormone that controls the salt levels in the blood (1)

3.4.2 Explain the:

(a) Shape of the graph between **B** and **C** (5)

(b) Salt concentration in the urine excreted between **D** and **E** (4)
[50]



TOTAL SECTION B: 100
GRAND TOTAL: 150

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