Western Cape Government
Education
FOR YOU

METRO NORTH EDUCATION DISTRICT

LIFE SCIENCES P1

GRADE 12

COMMON TRIAL EXAMINATION
SEPTEMBER 2024

MARKS: 150

TIME: 2 1/2 hours

This exam paper consists of 16 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 is a function of gibberellins

A Apical growth
B Stimulation of seed germination
C Inhibition of side branches
D Dropping of leaves in winter

1.1.2 A light stimulus is converted into a nerve impulse in the …

A Iris
B Retina
C Optic nerve
D Sclera

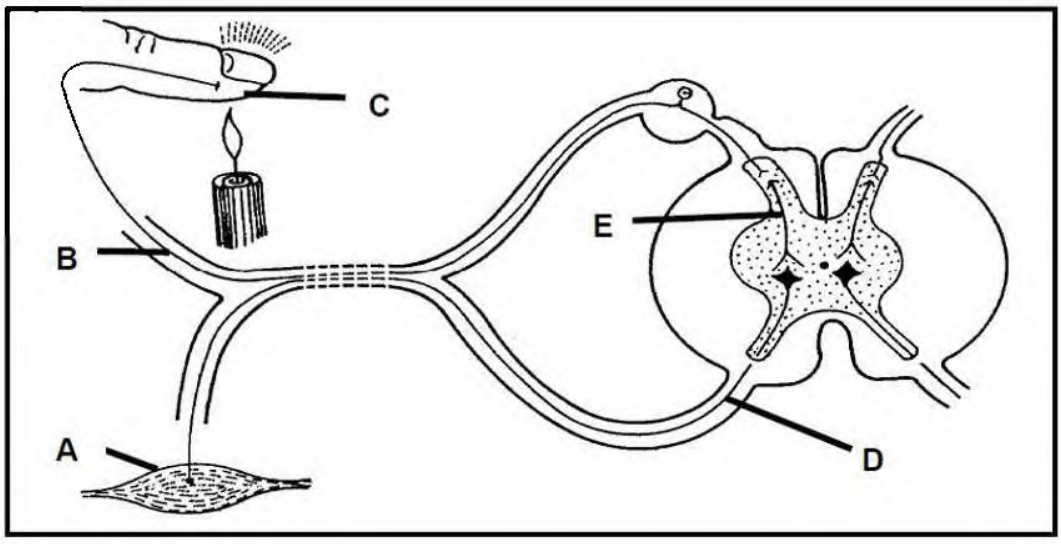
1.1.3 The level of aldosterone will most likely increase after …

A consuming food with a high salt content
B sweating excessively
C consuming food with a high glucose content
D the constriction of blood vessels to the skin

1.1.4 The part of the brain that is stimulated when a learner is exposed to a change in environmental temperature:

A Cerebellum
B Cerebrum
C Hypothalamus
D Corpus callosum

QUESTION 1.1.5 and QUESTION 1.1.6 are based on the diagram of a reflex arc shown below.



1.1.5 Part **B** indicates the …

A dendrite of the motor neuron
B axon of the motor neuron
C dendrite of the sensory neuron
D axon of the sensory neuron

1.1.6 The correct sequence in which impulses move from the receptor to the effector in the reflex arc above, is …

A A → B → C → D →E
B C →A →B → E→ D
C C →B →E →D →A
D A →D →E →B →C

1.1.7 An extract from a gland of an adult monkey was injected into the bloodstream of a young monkey. It caused the young monkey to grow abnormally tall. From which gland was the extract obtained?

A Hypothalamus
B Adrenal gland
C Pancreas
D Pituitary gland

1.1.8 A person experiences the following symptoms:

- Loses weight easily
- Is always hungry
- Never feels cold

The most likely explanation for this combination of symptoms is that the person …

A has an overactive thyroid gland
B secretes too much growth hormone
C is diabetic and just had an insulin injection
D has an underactive hypothalamus

1.1.9 A patient suffers from an under-secretion of ADH. This will lead to …

A a low concentration of sodium in the urine
B the presence of glucose in the urine
C increased thirst
D the formation of lower volumes of urine

1.1.10 A learner conducted an investigation to determine the percentage of people that are long-sighted.

The factor that is LEAST likely to affect such an investigation is the …

A height of the people
B age of the people in the sample
C light intensity of the room in which the test was conducted
D distance between the tool used to test the sight and the person being tested.

(10X2) **(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 The type of egg produced by reptiles that has extra-embryonic membranes

1.2.2 The tube in the male reproductive system that transports sperm to the urethra

1.2.3 A layer inside the eye that absorbs light, thus reducing reflection

1.2.4 A hormone produced by the hypophysis that stimulates milk production in human females

1.2.5 The process of maintaining a constant internal environment in the human body

1.2.6 The system in the body that regulates processes by secreting hormones directly into the blood

1.2.7 The structure that the Graafian follicle develops into after ovulation

1.2.8 The branch of the autonomic nervous system that restores an increased heart rate back to normal

1.2.9 The homeostatic process whereby temperature is controlled in the body

1.2.10 Sharp structures found in plants for protection from herbivores

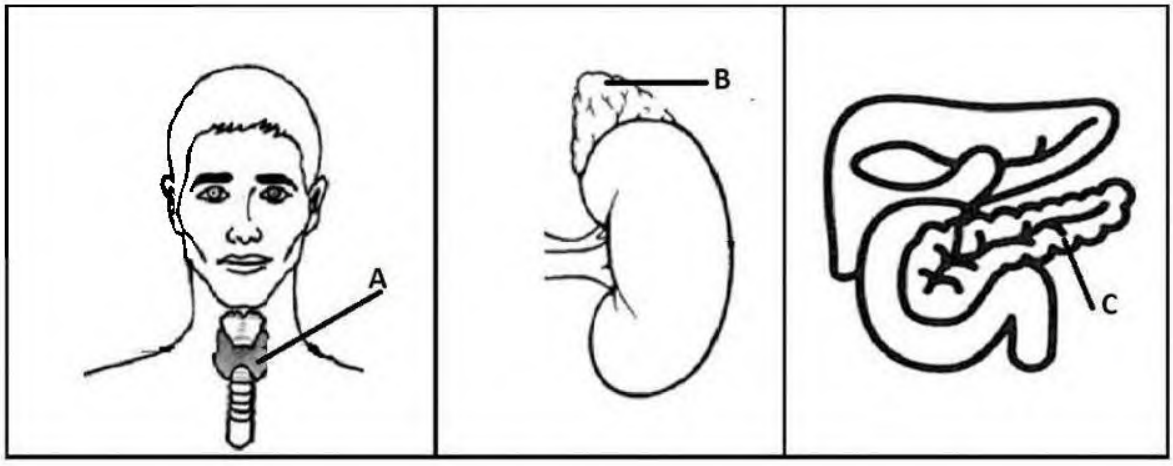
(10 x 1) **(10)**

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	Forms the placenta.	A: Amnion B: Chorion
1.3.2	A reproductive strategy in vertebrates where internal fertilization occurs	A: Altricial development B: Precocial development
1.3.3	A disorder caused by the degeneration of the myelin sheath of the motor neurons	A: Multiple sclerosis B: Alzheimer's disease

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

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



1.4.1 Identify the endocrine glands in the diagram labelled:

(a) **A** (1)

(b) **B** (1)

(c) **C** (1)

1.4.2 The functioning of the gland in diagram **A** is controlled by another hormone.

(a) Provide the name of this hormone. (1)

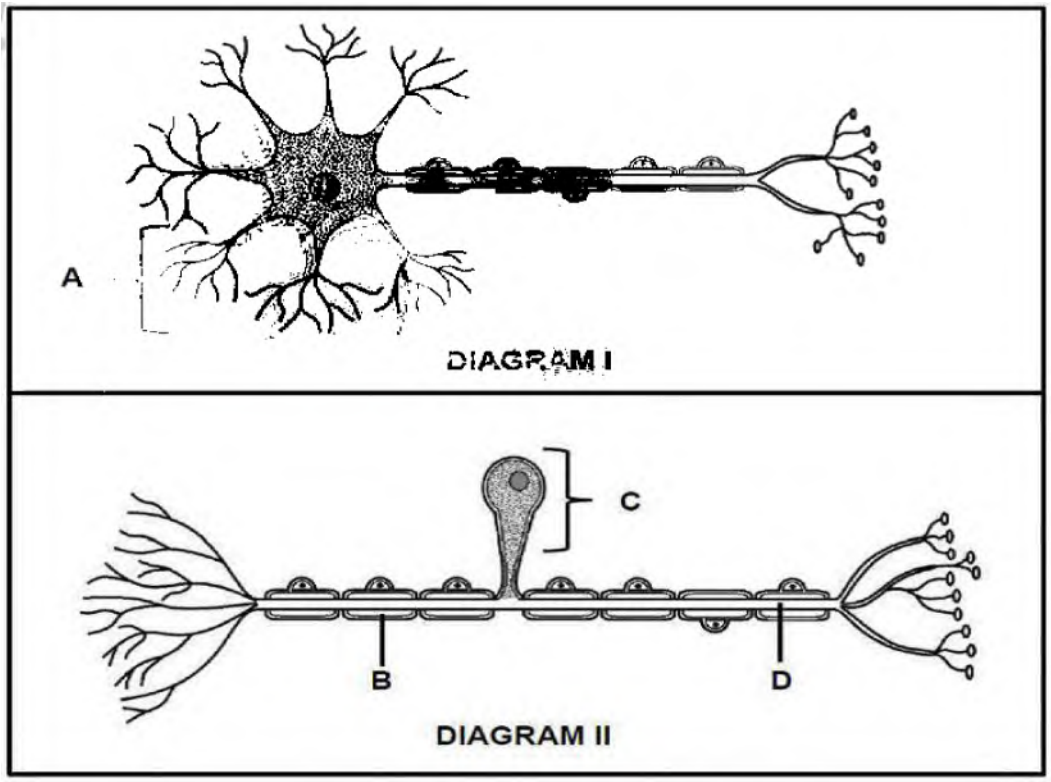
(b) Name the gland responsible for the secretion of the hormone identified in QUESTION 1.4.2 (a). (1)

(c) Name the type of interaction between the gland in diagram **A** and the gland mentioned in QUESTION 1.4.2 (b). (1)

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

1.4.4 Name the hormone secreted by the endocrine gland **C**, when the blood glucose levels are low. (1)
(8)

1.5 The diagrams below represent two types of neurons.



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 of the part that:

(a) Speeds up the transmission of impulses (1)

(b) Receives incoming impulses (1)

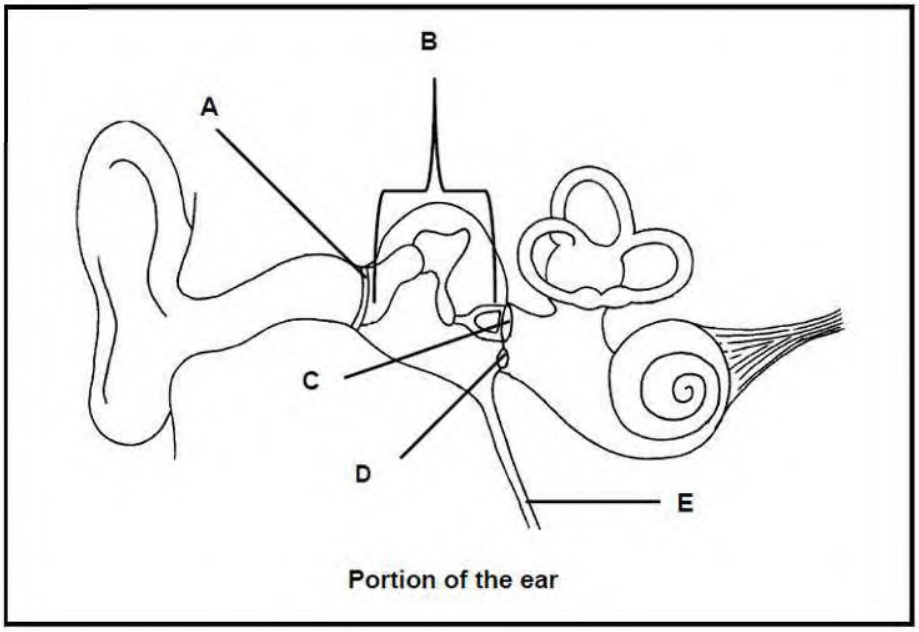
1.5.4 Which neuron (**I** or **II**) transmits impulses to the central nervous system. (1)
(6)

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 Study the diagram below showing a portion of the human ear and answer the questions that follow.



Portion of the ear

2.1.1 Provide labels for parts **B** and **C,** respectively. (2)

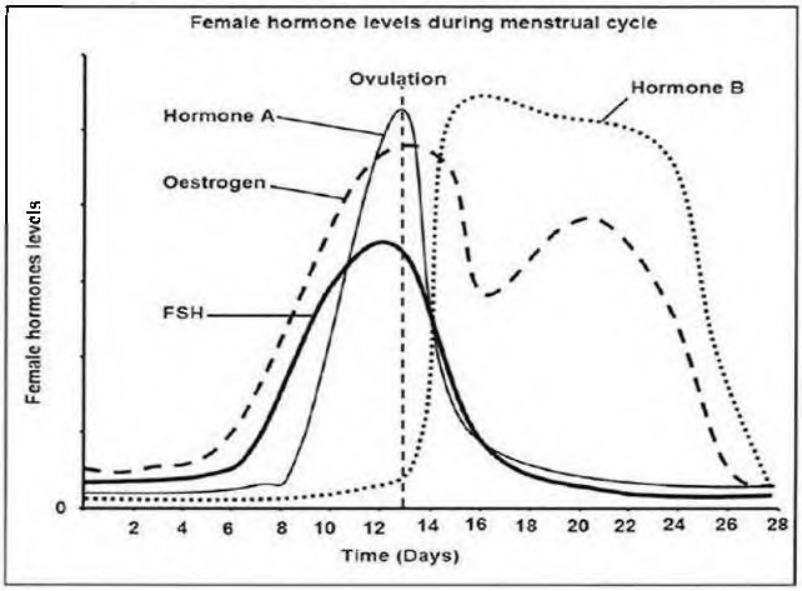
2.1.2 Give the LETTER and NAME of the part where grommets are inserted. (2)

2.1.3 State ONE function of part **D**. (1)

2.1.4 Explain the consequence for hearing if part **E** is blocked with mucus (3)

2.1.5 Describe the process of hearing from the time the sound waves reach part **A**. (6)
(14)

2.2 The graph below shows the female hormone levels during the menstrual cycle.



2.2.1 State TWO functions of hormone **A**. (2)

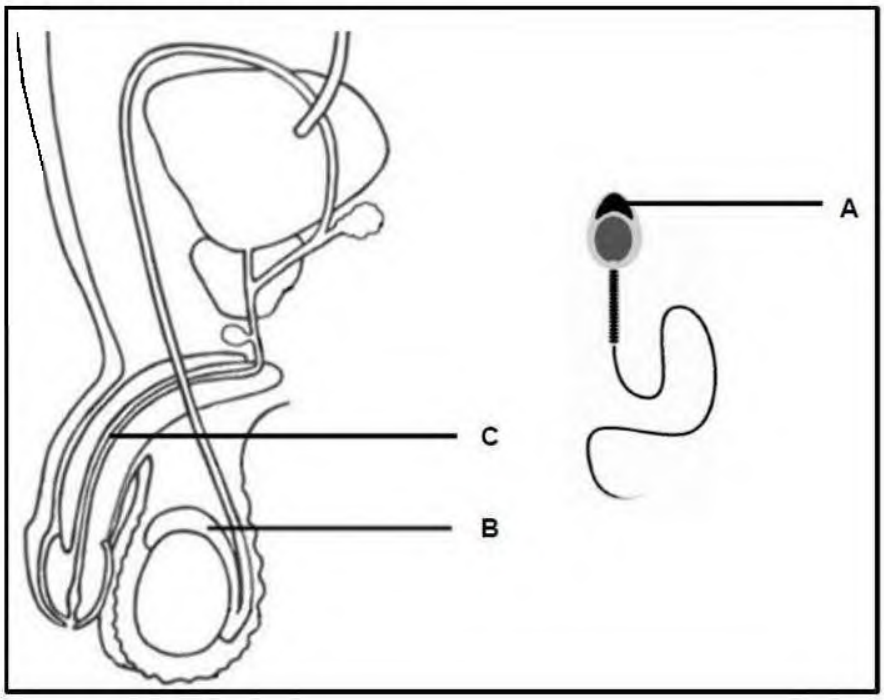
2.2.2 Describe the effect of oestrogen on the endometrium from day 7 to 13 of the cycle. (2)

2.2.3 Suggest a possible reason for the maintenance of a high level of hormone **B** beyond the 28-days of the cycle. (2)

2.2.4 Explain why the secretion of FSH is inhibited by the high levels of hormone **B**. (3)

(9)

2.3 Study the diagram below.



2.3.1 Identify parts:

(a) **B** (1)

(b) **C** (1)

2.3.2 Explain the role of part **A** during fertilization. (2)

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

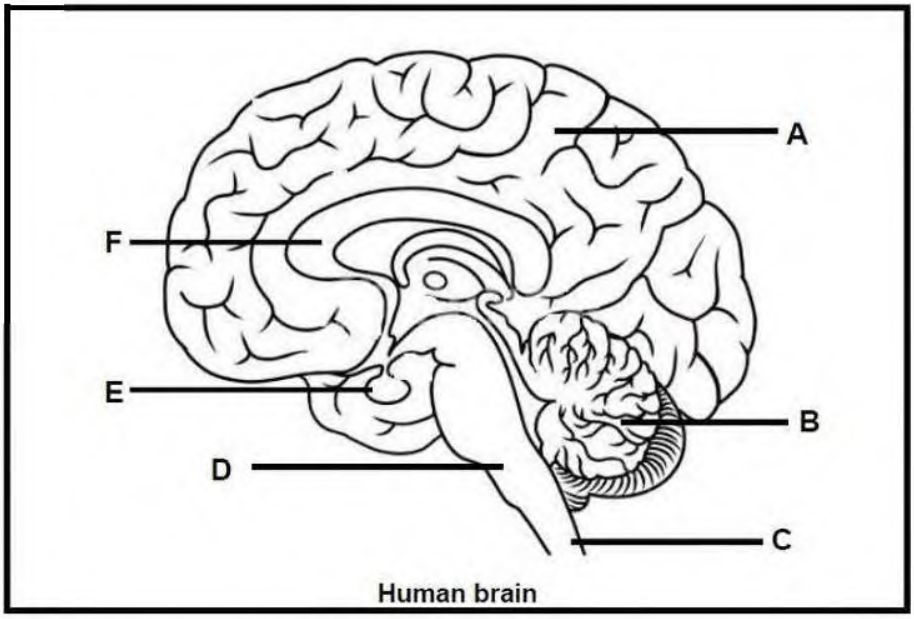
2.3.4

Sperm cells and ova are produced by gametogenesis. This happens when diploid cells undergo meiosis to produce haploid cells.

Tabulate TWO differences between gametogenesis in males and females, not mentioned in the text above. (5)

(11)

2.4 The diagram below shows a human brain.



Human brain

2.4.1 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)

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

2.4.3 A 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 heartrate. (2)

(11)

2.5 Describe the development of the zygote until implantation. **(5)**

[50]

QUESTION 3

3.1 Read the extract below.

REPRODUCTION IN GUPPY FISH

Guppy fish have a very interesting method of breeding. During mating the male deposits packets of sperm inside the female's reproductive opening using an organ called the 'gonopodium'. This process takes place several times and the female stores some of the extra sperm.

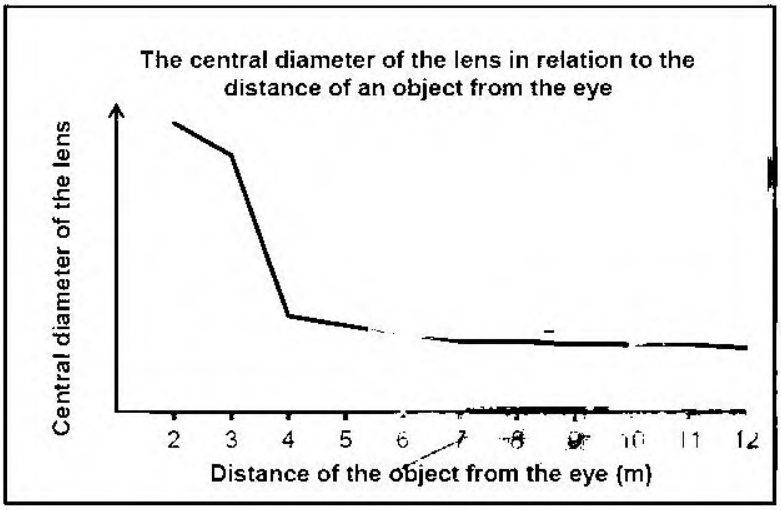
The fertilised eggs remain in the female's body until they hatch and the young are born live. The gestation period is usually between 22 and 28 days.

3.1.1 Name the type of fertilization in guppies. (1)

3.1.2 Explain ONE way in which this type of fertilization named in QUESTION 3.1.1 increases reproductive success. (2)

3.1.3 State why guppies are regarded as ovoviviparous? (2)
(5)

3.2 The following graph shows the change in the central diameter of the lens of the human eye while looking at an object at different distances from the eye.



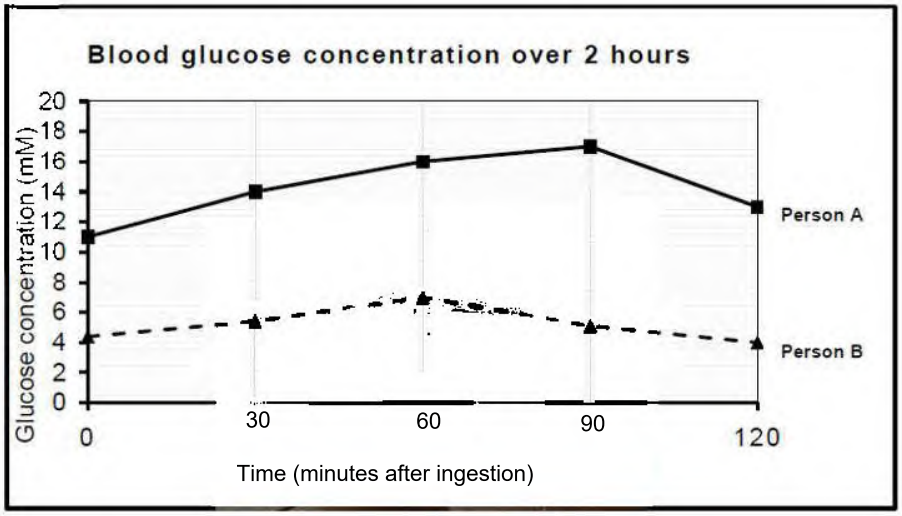
3.2.1 Name the physical process that is illustrated by the graph. (1)

3.2.2 Explain TWO ways in which the lens is structurally suited to perform its function. (4)

3.2.3 Describe the relationship between the distance of the object from the eye and the diameter of the lens. (2)

3.2.4 Explain how the shape of the lens enables a person to read a book. (3)
(10)

3.3 The graph below shows the blood glucose concentration of two people (**A** and **B**) over a period of 2 hours after they consumed 100g of a glucose drink.



3.3.1 Person **A** is not able to regulate his blood glucose level effectively.

(a) Name the disease that person **A** has. (1)

(b) Explain ONE possible reason why the blood glucose concentration remains high in person **A**. (2)

3.3.2 Calculate the difference between the blood glucose concentration(mM) of person **A** and person **B** at 120 minutes. Show your calculations. (2)

3.3.3 Name TWO hormones that will have the opposite effect on the blood glucose concentration to that of insulin. (2)
(7)

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

The procedure was as follows:

100 healthy weightlifting males of the same age were asked to participate in the investigation for 8 weeks.

- They were given the same diet and training routine for 8 weeks
- Their testosterone levels in the blood were measured every day for the 8-week period
- They were given a creatine supplement with their diet every day for 8 weeks
- The testosterone levels in the blood were measured again every day
- The average levels of testosterone in the blood were calculated before and after the creatine supplement

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

	Average testosterone in blood (ulU/mL)
Before administering the creatine supplement	20,5
After administering the creatine supplement	20,5

3.4.1 Formulate an investigative question for this investigation. (2)

3.4.2 State TWO factors that was considered about the weightlifters to ensure the validity of this investigation. (2)

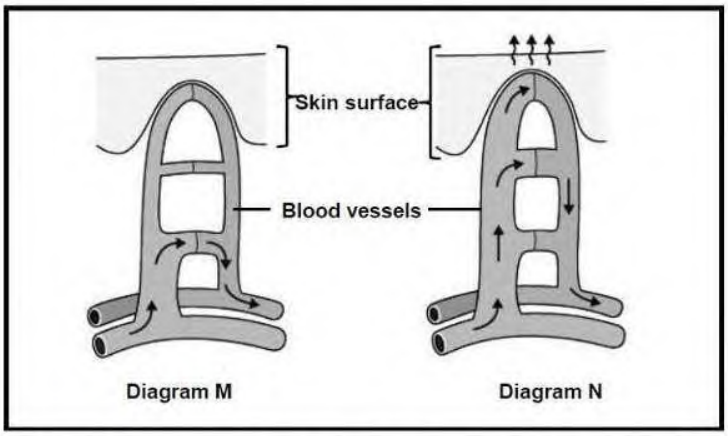
3.4.3 State TWO ways in which the reliability of the results was ensured for this investigation. (2)

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

3.4.5 State a general conclusion that can be drawn from the results obtained. (2)

3.4.6 Name TWO functions of testosterone in male reproduction. (2)
(12)

3.5 The diagram below shows the blood vessels of the skin at different environmental temperatures. The arrows in the blood vessels indicate the direction of blood flow.

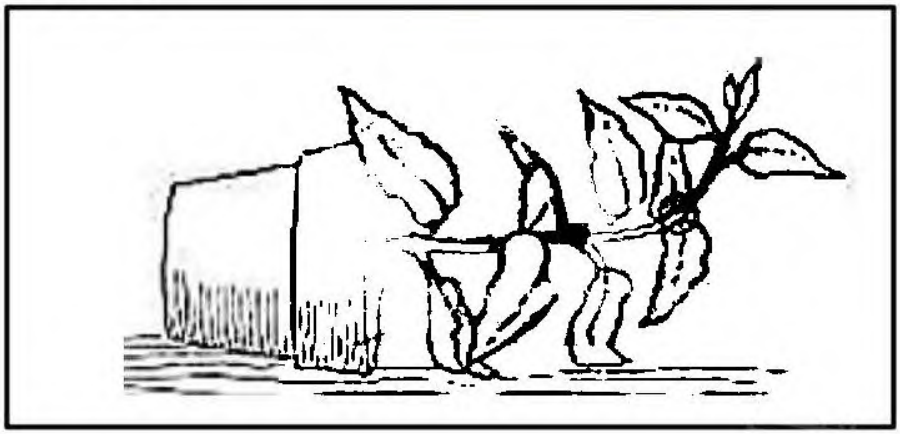


3.5.1 Which diagram (**M** or **N**) represents the blood vessel at low environmental temperature? (1)

3.5.2 Explain your answer to QUESTION 3.5.1 using evidence from the diagram. (3)

3.5.3 Describe the role of the sweat glands on a hot day. (3)
(7)

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



3.6.1 Name the growth response which is indicated by the stem's upward growth. (1)

3.6.2 Name the plant hormone which is responsible for the stem's upward growth. (1)

3.6.3 Explain the growth response observed in the stem. (5)

3.6.4 Explain ONE way in which the stems upward growth benefits the plant. (2)
(9)
[50]

TOTAL SECTION B: 100
GRAND TOTAL: 150