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**PROVINSIALE VOORBEREIDENDE EKSAMEN/
PROVINCIAL PREPARATORY EXAMINATION**

GRAAD/GRADE 12

LIFE SCIENCES P1

SEPTEMBER 2024

PUNTE/MARKS: 150

TYD/TIME: 2½ uur/hours

**Hierdie vraestel bestaan uit 16 bladsye./
This question 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 The structure in the male reproductive system where sperms are temporarily stored is the ...

- A testis.
- B epididymis.
- C vas deferens.
- D penis.

1.1.2 The part of the brain which receives impulses from the sacculus and utricle is the ...

- A hypothalamus.
- B cerebrum.
- C cerebellum.
- D medulla oblongata.

1.1.3 Reproductive strategies used by ground nesting birds, such as the ostrich, include ...

- A external fertilisation and ovipary.
- B ovovivipary and no parental care.
- C vivipary and internal fertilisation.
- D ovipary and internal fertilisation.

1.1.4 Which ONE of the following shows the correct sequence of an impulse received from the receptor in a simple reflex arc?

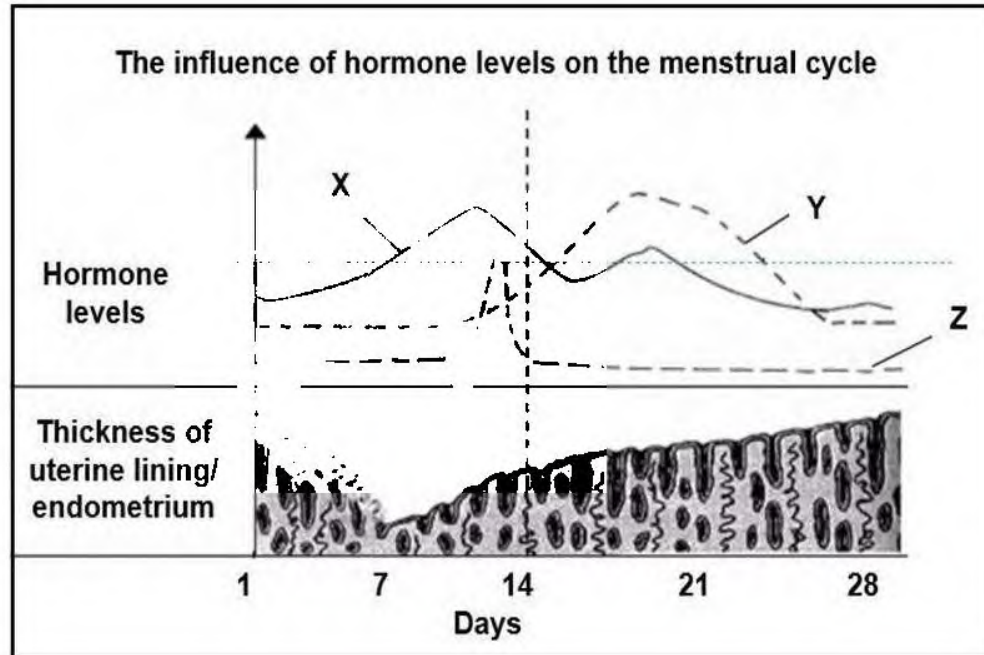
- A Sensory neuron through dorsal root → motor neuron through ventral root → effector
- B Motor neuron through dorsal root → sensory neuron through ventral root → effector
- C Sensory neuron through dorsal root → effector → motor neuron through ventral root
- D Effector → interneuron through dorsal root – motor neuron through the ventral root



1.1.5 Which ONE of the following represents the correct sequence of development after fertilisation has taken place?

- A Ovum → Zygote → Blastocyst → Morula → Foetus
- B Zygote → Morula → Blastocyst → Foetus
- C Ovum → Zygote → Morula → Blastocyst → Foetus
- D Zygote → Blastocyst → Morula → Foetus

1.1.6 The graph below shows the menstrual cycle and the influence that different hormones have on it.



Which ONE of the following shows the pattern/trend of the level of hormones **X** and **Z** from days **13** to **14**?

- A **X** decreases and **Z** increases
- B Both **X** and **Z** decreases
- C **X** and **Z** are at their optimum level
- D Both **X** and **Z** increases

1.1.7 Damage to the dendrites of a motor neuron in a reflex arc would probably prevent ...

- A a receptor from receiving a stimulus.
- B synaptic contact with a sensory neuron.
- C an impulse from being transmitted to an effector organ.
- D an impulse from being transmitted to the spinal cord.



- 1.1.8 The part of the brain that regulates breathing is the ...
- A medulla oblongata.
 - B cerebrum.
 - C corpus callosum.
 - D cerebellum.
- 1.1.9 The auditory nerve transmits impulses to the ...
- A cerebrum and medulla oblongata.
 - B cerebrum and cerebellum.
 - C cerebellum and medulla oblongata.
 - D cerebrum and corpus callosum.
- 1.1.10 A gardener regularly removes the apical buds from a rose bush in her garden. As a result, the rose bush will ...
- A produce more lateral branches.
 - B grow taller.
 - C remain the same size.
 - D produce fewer roses.
- (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 1.2.8) in the ANSWER BOOK.

- 1.2.1 A structure in the eye that absorbs light to prevent internal reflection
- 1.2.2 The blood vessel that transports deoxygenated blood from the foetus towards the placenta
- 1.2.3 A small device that is inserted in the ear to drain fluids caused by a middle-ear infection
- 1.2.4 A sub-division of the human nervous system which consists of cranial and spinal nerves
- 1.2.5 The period of development of an embryo in the uterus, between fertilisation and birth
- 1.2.6 The plant hormone that causes leaves to fall from trees in autumn
- 1.2.7 The growth response of a part of a plant to a light stimulus
- 1.2.8 A disorder of the eye caused by the curvature of the lens or cornea being uneven, resulting in distorted images
- (8 x 1) (8)

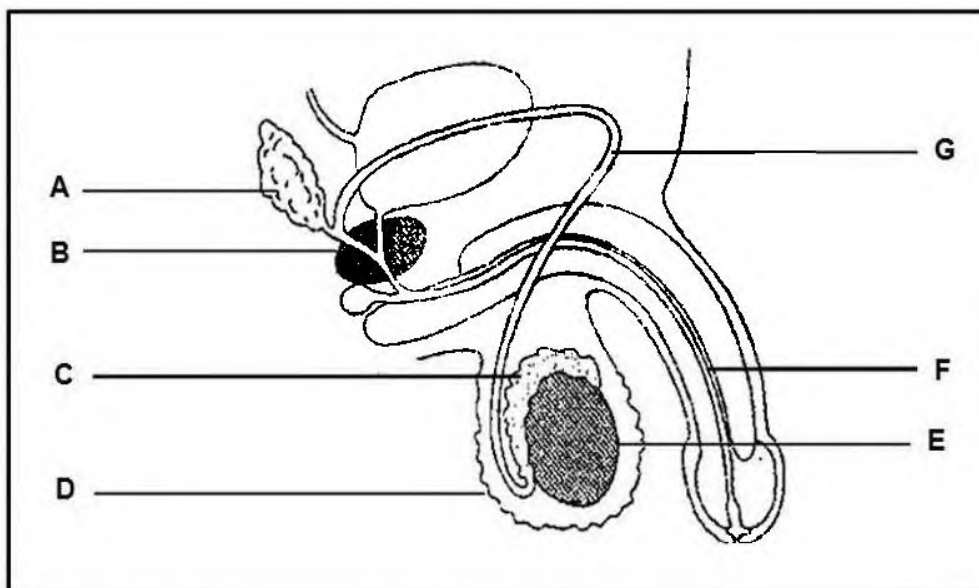
- 1.3 Indicate whether each of the descriptions in COLUMN I apply to **A ONLY**, **B ONLY**, **BOTH A AND B** or **NONE** of the items in COLUMN II. Write **A only**, **B only**, **both A and B** or **none** next to the question numbers (1.3.1 to 1.3.3) in the ANSWER BOOK.

COLUMN I	COLUMN II
1.3.1 Plant hormone that stimulates the germination of seeds	A: Gibberellins B: Absciscic acid
1.3.2 Stimulates the conversion of glycogen to glucose	A: Glucagon B: Adrenalin
1.3.3 Secretions from this gland contribute to the formation of semen	A: Cowper's gland B: Prostate gland

(3 x 2)

(6)

- 1.4 The diagram below represents the structure of the male reproductive system.



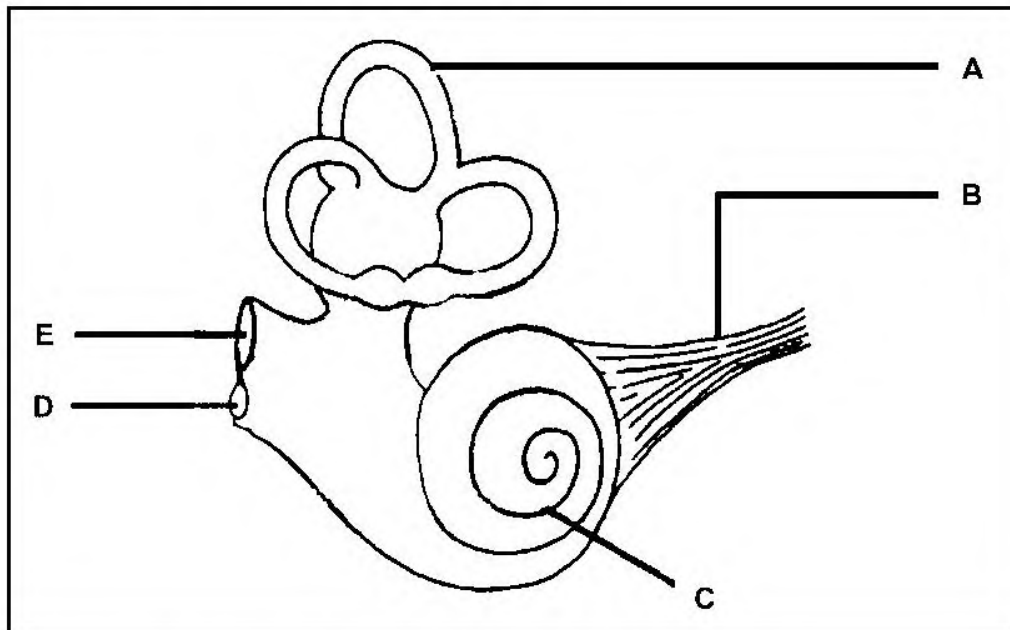
- 1.4.1 Identify part:

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

- 1.4.2 Give the LETTER and the NAME of the structure that:

- (a) Secretes the main source of nutrients for sperm cells (2)
(b) Controls the temperature for healthy sperm production (2)
(c) Secretes the hormone testosterone (2)
(8)

1.5 The diagram below shows parts of the inner ear.



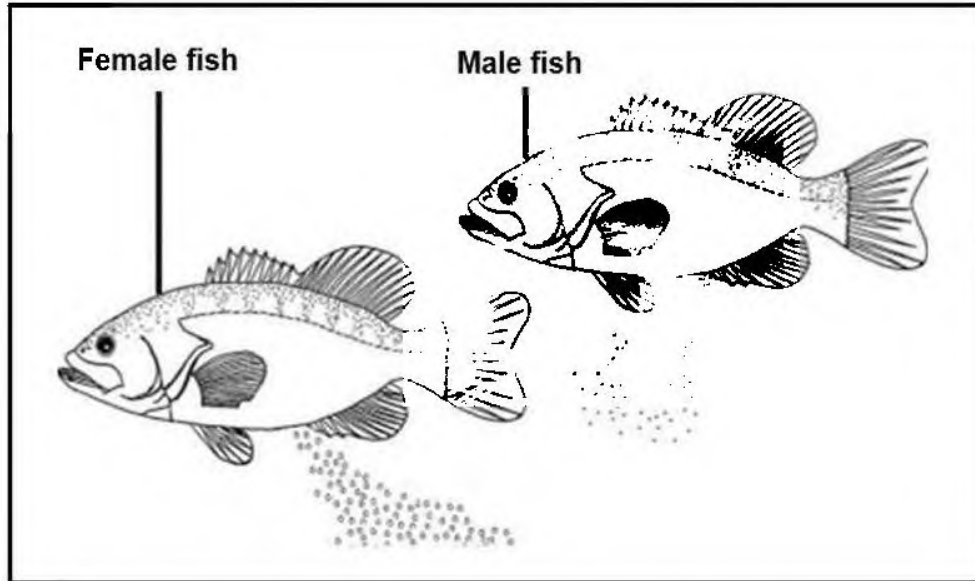
- 1.5.1 Identify part **B**. (1)
- 1.5.2 Give the name of the receptor found in part **C**. (1)
- 1.5.3 Give the LETTER and the NAME of the structure that:
- (a) Creates pressure waves in the inner ear (2)
 - (b) Absorbs excess pressure waves from the cochlea (2)
 - (c) Detects changes in the movement of the head (2)
- (8)**

TOTAL SECTION A: 50



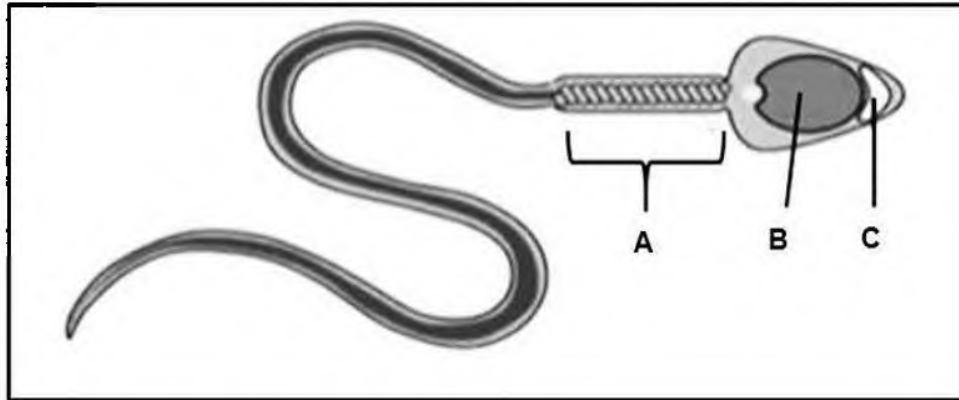
SECTION B**QUESTION 2**

2.1 The diagram below shows a certain species of fish mating.



- 2.1.1 Identify the type of fertilisation displayed by this fish species. (1)
- 2.1.2 State TWO visible ways in which the chances of fertilisation in these fish are increased. (2)
- 2.1.3 Name the reproductive strategy used by these fish that involves the laying of eggs. (1)
- 2.1.4 Explain ONE reason why there is no need for the eggs of these fish to be covered by a hard or leathery shell. (2)
- (6)**

2.2 The diagram below represents a sperm.



2.2.1 Identify part:

(a) **A** (1)

(b) **B** (1)

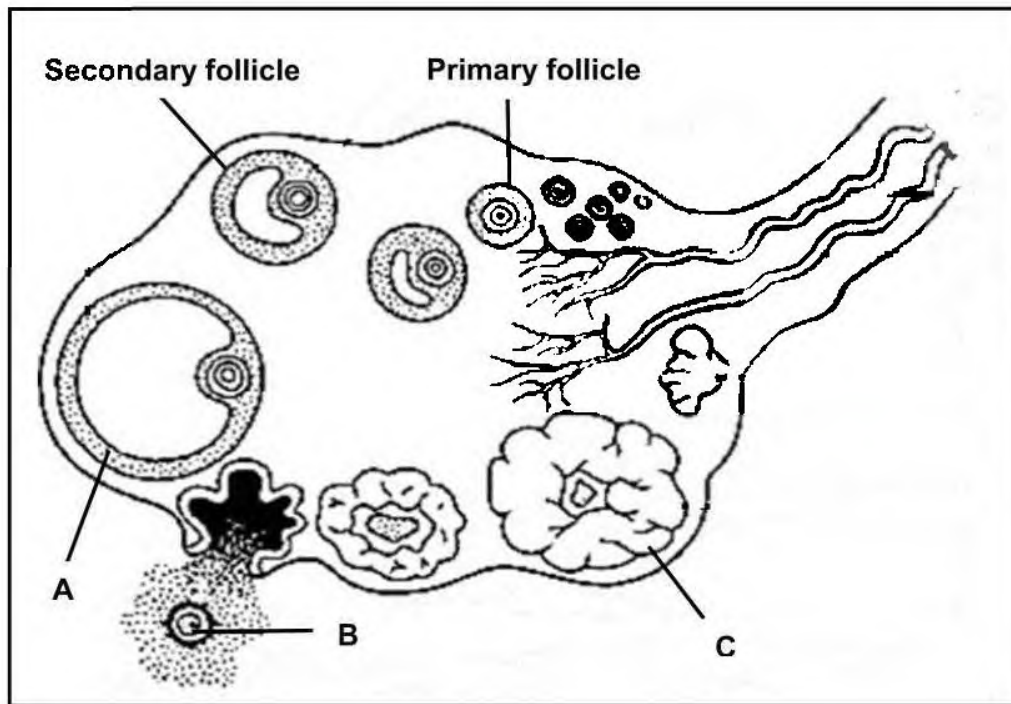
2.2.2 Explain TWO ways in which the sperm is structurally suited to ensure effective movement towards the Fallopian tubes. (4)

2.2.3 Explain the consequences for reproduction if a sperm does not have part **C**. (3)

2.2.4 Explain how the male body ensures that the sperm cells are not killed by acidic urine as they travel through the urethra. (2)
(11)



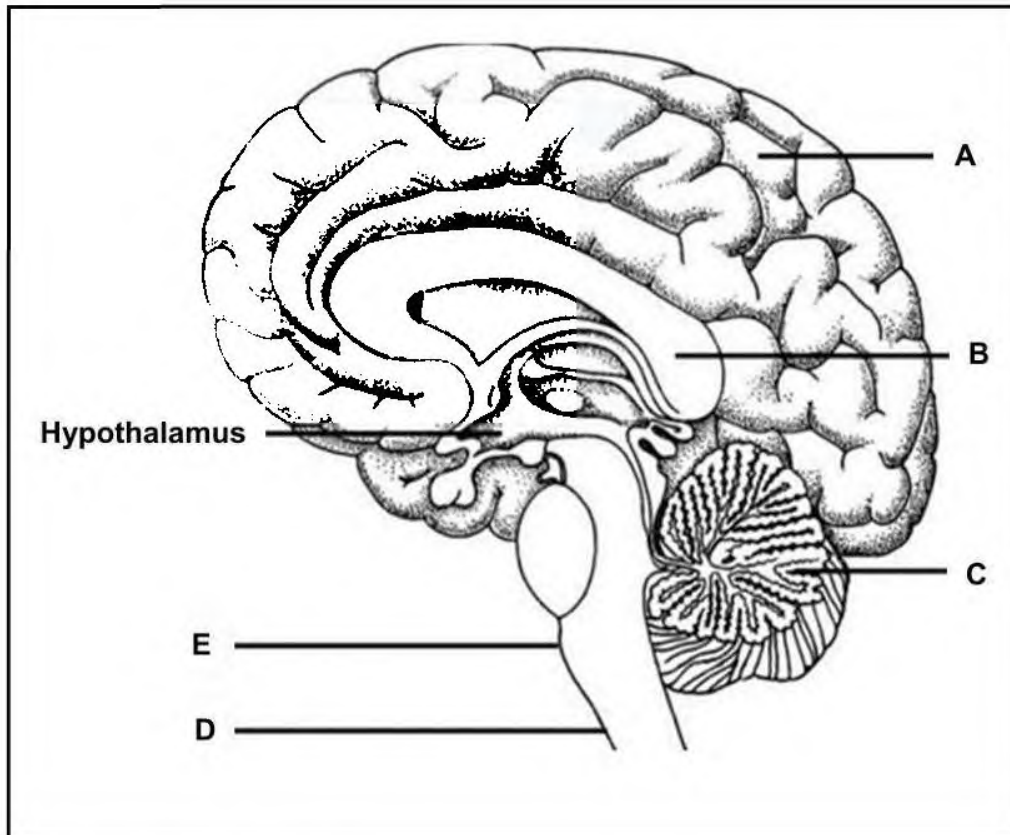
- 2.3 The diagram below shows events in the ovary of a human female during the menstrual cycle.



- 2.3.1 Name the hormone responsible for the:
- Formation of structure **A** (1)
 - Release of structure **B** (1)
- 2.3.2 Give the number of chromosomes found in the nucleus of structure **B**. (1)
- 2.3.3 Explain the implications for the ovarian cycle if structure **C** degenerates. (3)
- 2.3.4 Ovariectomy is a term used to describe the surgical removal of only the ovaries. They can be removed due to certain illnesses such as cancer.
- Explain why a female who had an ovariectomy will not menstruate. (4)
- 2.3.5 Draw a labelled diagram of structure **B**. (4)
- (14)**



- 2.4 The diagram below represents part of the central nervous system of a human.



2.4.1 Identify part:

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

2.4.2 Only give the LETTER of the part responsible for a reflex action that occurs when stepping on a sharp object while barefoot. (1)

2.4.3 Name the system of membranes that surrounds the brain. (1)

2.4.4 State TWO functions of part **C**. (2)

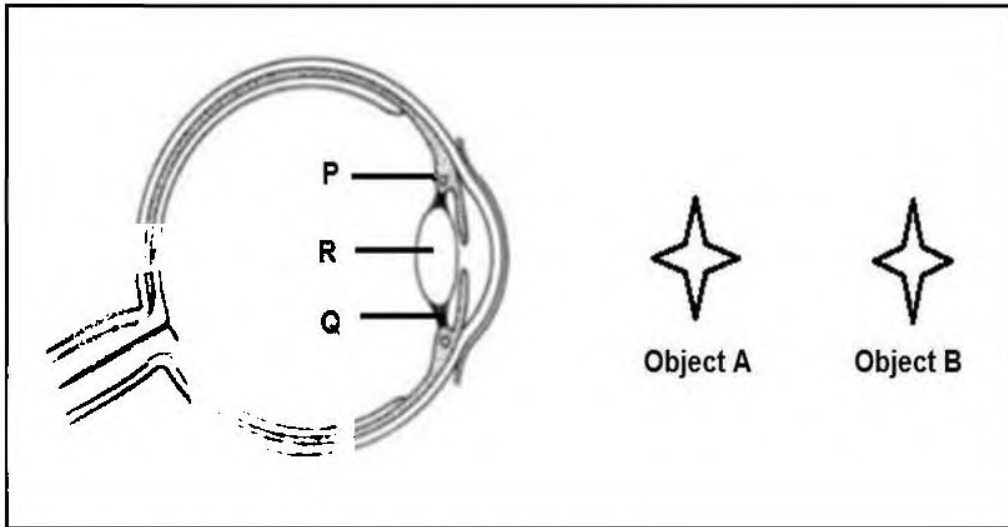
2.4.5 Explain how the reabsorption of water of a person who injured the hypothalamus in an accident, will be affected. (3)

(9)



- 2.5 The diagram below represents a human eye when the person is looking at two objects (**A** and **B**) at various distances from the eye.

Object **A** is placed 3 meters away and Object **B** is placed 8 meters away.



- 2.5.1 Name the area on the retina which:
- (a) Is responsible for forming the clearest image (1)
 - (b) Has no rods and cones (1)
- 2.5.2 Name the disorder that results in the inability of the eye to focus on object **B**. (1)
- 2.5.3 What type of lens should be used to correct the disorder mentioned in QUESTION 2.5.2? (1)
- 2.5.4 Explain the role of structures **P**, **Q** and **R** to ensure a clear image if the person moves his focus from object **B** to object **A**. (6)
- (10)
[50]



QUESTION 3

3.1 Read the extract below.

WHAT IS AN EAR INFECTION (OTITIS MEDIA)?

Ear infection, also called otitis media, is an infection in the middle ear. The middle ear is the air-filled space between the eardrum and inner ear and it houses the delicate bones that transmit sound vibrations from the eardrum to the inner ear.

The Eustachian tube regulates air pressure in the ear and prevents fluid from accumulating in the middle ear. Ear infections caused by viruses and bacteria can result in the buildup of fluid in the middle ear and often cause discomfort and hearing loss. Middle ear infections occur most often in children between 6 months and 2 years of age.

Children get ear infections more often than adults because:

- Their shorter, more horizontal Eustachian tubes let bacteria and viruses find their way into the middle ear more easily
- The tubes are also narrower, so they are more likely to get blocked

- 3.1.1 Give the collective name for the delicate bones located in the middle ear. (1)
- 3.1.2 From the extract, state:
- (a) The medical term for middle ear infection (1)
- (b) ONE micro-organism that can cause middle ear infection (1)
- (c) TWO functions of the Eustachian tube (2)
- 3.1.3 Explain ONE reason why children get middle ear infection more often than adults. (2)
- 3.1.4 Explain why middle ear infections can lead to hearing loss. (4)
- (11)**



- 3.2 Energy drinks are very popular amongst the youth and are regularly consumed by 31% of 12- to 17-year-olds and 34% of 18- to 24-year-olds.

An investigation was carried out to determine the effect of caffeine on body temperature. A group of 200 men participated in the investigation.

The procedure was as follows:

- At the start of the investigation, each man's body temperature was measured, and the average of all the participants was calculated.
- The men each drank 100 ml of the same type of energy drink.
- Their body temperature was then measured every 15 minutes for a period of 1 hour, and an average for all the participants was calculated.
- All the participants were seated during the period of the investigation.

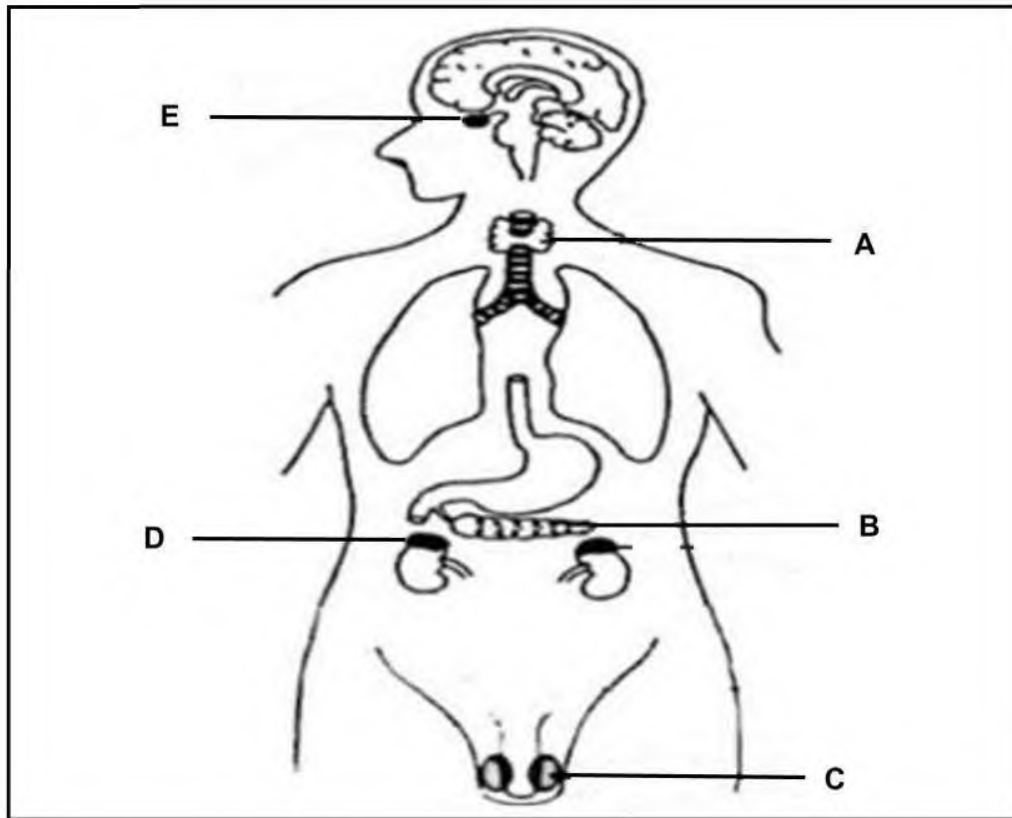
The table below shows the results of the investigation.

TIME (minutes)	AVERAGE BODY TEMPERATURE (°C)
0	36,6
15	37,2
30	38
45	37,6
60	37,4

- 3.2.1 Identify the: (1)
- (a) Independent variable (1)
- (b) Dependent variable (1)
- 3.2.2 State how the scientist improved the reliability of the results. (1)
- 3.2.3 Mention TWO ways in which the scientist have improved the validity of the investigation. (2)
- 3.2.4 State the effect that caffeine had on the body temperature after 15 minutes. (1)
- 3.2.5 State how long after drinking the energy drink, the caffeine had its maximum effect. (1)
- 3.2.6 Studies show that caffeine causes an increase in metabolism.
- Explain how this effect contributes to the temperature change that occurred from 0 to 30 minutes. (2)
- 3.2.7 Draw a line graph to represent the data in the table. (6)
- (15)**



- 3.3 The diagram below shows the position of the endocrine glands found in a male human body.



- 3.3.1 Identify the LETTER and NAME of the gland that secretes a hormone which:

- (a) Stimulates the growth of long bones (2)
- (b) Regulates the salt balance (2)
- (c) Controls the sugar levels in the body (2)

- 3.3.2 Explain the consequences to the body mass of a person if the hormone secreted by gland **A** remains abnormally high for extended periods of time. (3)
(9)

- 3.4 Andile took part in the Comrades marathon, which is a long distance race. On the day of the race it was very cold.

- 3.4.1 State FIVE ways in which adrenalin will enable his muscles to function efficiently during the first part of the race. (5)

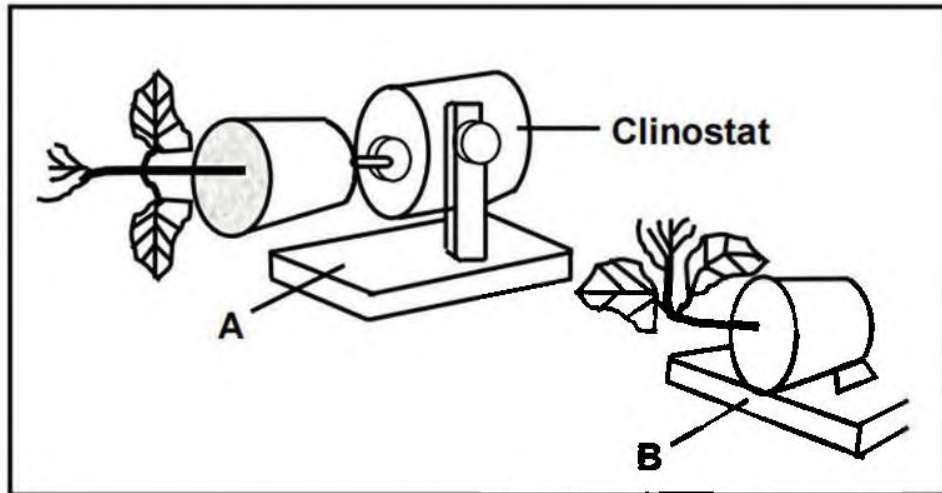
- 3.4.2 Describe how the sweat glands control his body temperature in this cold environment. (3)
(8)



3.5 A group of Grade 12 learners set up the following apparatus:

- They used two potted plants.
- One plant was placed on a rotating clinostat (Diagram **A**) and the other plant was placed on a stationary clinostat (Diagram **B**).
- They left the apparatus inside a dark cupboard for two weeks before making the observations as indicated in the diagram below.

NOTE: A clinostat is an apparatus that can rotate.



- 3.5.1 Name the type of tropism that is observed. (1)
- 3.5.2 Explain the results illustrated in diagram **B**. (5)
- 3.5.3 State ONE reason why the apparatus was placed in a dark cupboard for the duration of the investigation. (1)
- (7)
- [50]**

TOTAL SECTION B: 100
GRAND TOTAL: 150

