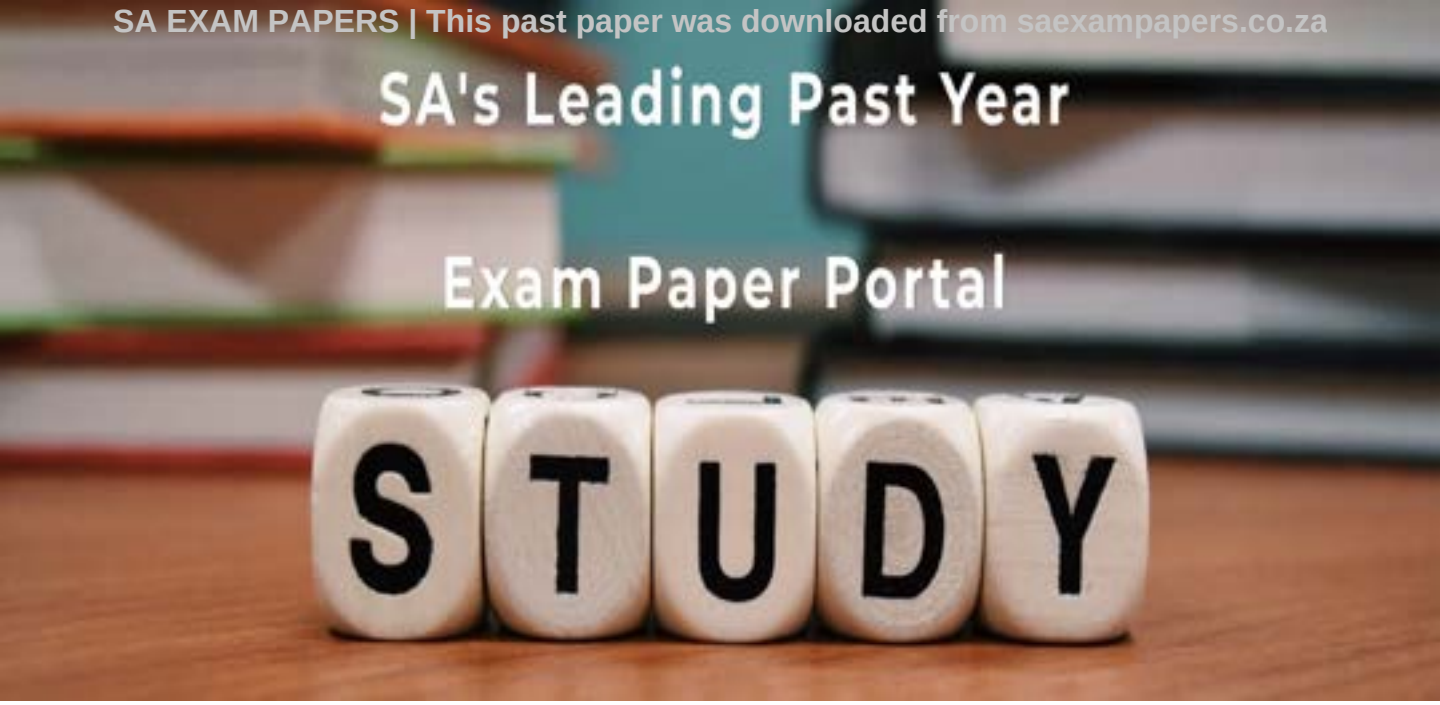


LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
EDUCATION

PRE –MID YEAR EXAMINATION
LIFE SCIENCES
GRADE 12
2025

MARKS: 150

2H30 MIN

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 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 correct answer and write only the letter (A to D) next to the question number (1.1.1 to 1.1.10) in the ANSWER BOOK, for example 1.1.11 D.

1.1.1 The structure in the amniotic egg that removes waste products

A Yolk sac

B Chorion

C C Amnion

D Allantois (2)

1.1.2 The difference between a nucleic acid and a nucleotide:

A Nucleotides are building blocks of nucleic acids

B Nucleic acids are building blocks of nucleotides

C Nucleic acids are in the nucleus and nucleotides are in the cytoplasm

D Nucleotides are larger than nucleic acids (2)

1.1.3 Curly hair is dominant over straight hair. A woman who is homozygous for curly hair marries a man homozygous for straight hair.

What is the possibility of them having a child with straight hair?

A 25%

B 50%

C 100%

D 0% (2)

1.1.4 The function of the epididymis is to ...

A Produce semen.

B Transport sperm to the urethra.

C Store sperm until maturation

D D Produce sperm. (2)

1.1.5 A list of some compounds of the nervous system is provided below:

(i) Brain

(ii) Cranial nerves

(iii) Spinal nerves

(iv) Spinal cord

Which ONE of the following combinations applies to the central nervous system?

A (i),(ii) ,(iii) and (iv)

B (i) and (iv) only

C (ii),(iii) and(iv) only

D (iii) and(iv) only (2)

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

A Sensory neuron through the dorsal root → motor neuron through the ventral root → effector

B Motor neuron through the dorsal root → sensory neuron through the ventral root → effector

C Sensory neuron through the dorsal root → effector → motor neuron through the ventral root

D Effector → interneuron through the dorsal root → motor neuron through the ventral root (2)

1.1.7 The myelin sheath on a nerve cell ...

A Provides electrical insulation.

B Transports impulses towards the cell body.

C Receives impulses from the axon.

D Converts stimuli into impulses. (2)

1.1.8 The part of the brain that receives impulses from the maculae...

A Cerebellum

B Cerebrum

C Hypothalamus

D Corpus callosum (2)

1.1.9 Which ONE of the following is the genotype of a person with haemophilia?

A X^HX^h

B X^HY

C X^HX^H

D X^hY (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 1.2.6) in the ANSWER BOOK.**

1.2.1 The disease characterised by the degeneration of brain tissue, leading to memory loss

1.2.2 Gland in the brain that produces FSH and LH

1.2.3 The division of the cytoplasm immediately after the nuclear division

1.2.4 Process by which an ovum is released from the ovary in humans

1.2.5 The principle that describes how alleles are separated from one another during the formation of gametes

1.2.6 The structure in an animal cell that forms spindle fibres

1.2.7 The blood vessel that carries oxygenated blood from the placenta to the foetus

1.2.8 Collective name for the membranes that surround the brain and spinal cord

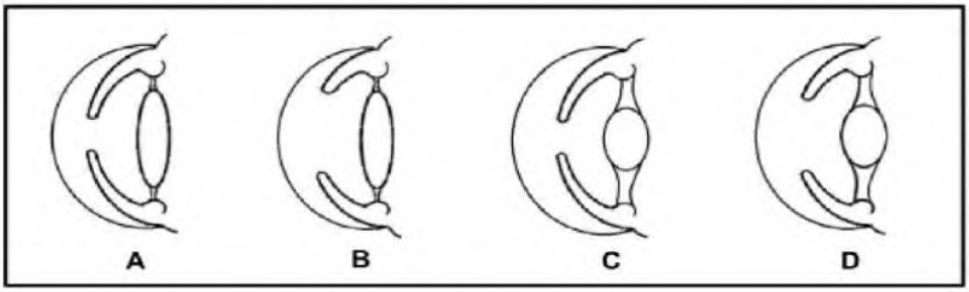
(8)

1.3 Indicate whether each of the statements 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 1.3.8) in the ANSWER BOOK.

COLUMN I	COLUMN II
1.3.1 Offspring are born small and helpless	A. Altricial B. Precocial
1.3.2 The reproductive structures where meiosis occurs	Testes Ovaries
1.3.3 The young develop and is nourished in an amniotic egg that is retained in the mother	A. Ovipary B. Vivipary
1.3.4 The functional connection between two consecutive neurons	A. Receptor B. Synapse

X 4)

1.4 The diagrams below show part of the eye under different conditions.



1.4.1 Name the process that occurs when the:

(a) Curvature of the lens changes to focus on a near or distant object (1)

(b) Pupil size changes to regulate the amount of light entering the eye (1)

1.4.2 Give the LETTERS of TWO diagrams (**A**, **B**, **C** or **D**) that represent the condition of the eye of a person:

(a) In dim light (2)

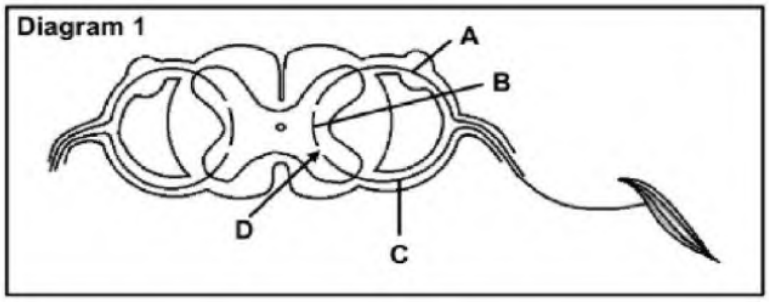
(b) Focusing on a distant object (2)

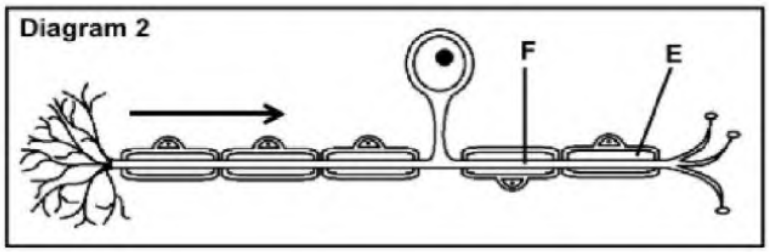
1.4.3 Give the LETTERS of TWO diagrams (**A**, **B**, **C** or **D**) that represent the eye of a person whose:

(a) Ciliary muscles are contracted (2)

(b) Radial muscles are relaxed (2)
(10)

1.5 Diagram **1** below represents part of a reflex arc and diagram **2** represents a neuron.





1.5.1 Identify:

(a) Layer **E** (1)

(b) Structure **F** (1)

1.5.2 Which neuron (**A**, **B** or **C**):

(a) Represents the type of neuron shown in diagram **2** (1)

(b) Is damaged when a person can feel the stimulus but cannot respond to it (1)

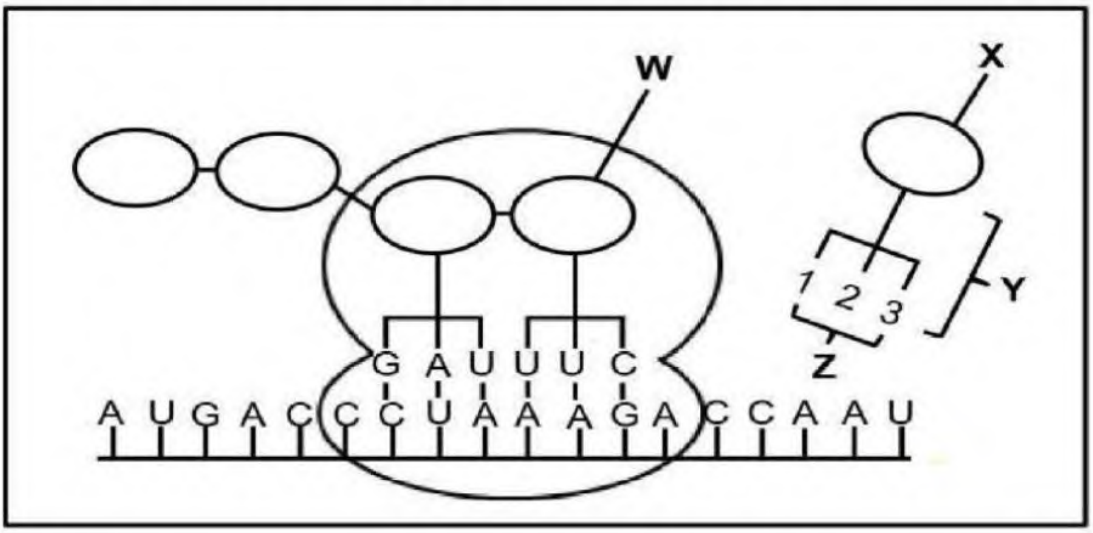
1.5.3 Give the LETTER and NAME of the part that ensures one-directional flow of the impulse. (2)
(6)

TOTAL SECTION A: 50 MARKS

SECTION B

QUESTION 2

2.1 The diagram below shows part of a process involved in the production of a protein.



2.1.1 Name:

(a) Molecule **Y** (1)

(b)The group of nitrogenous bases **Z** (1)

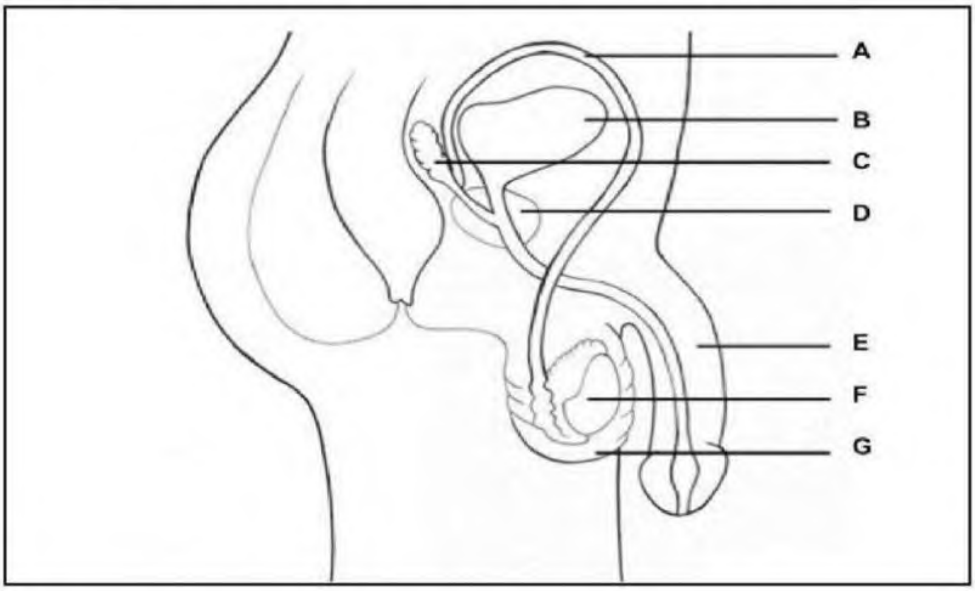
2.1.2 If **X** is the next amino acid required after **W**, then identify:

(a) Nitrogenous bases 1, 2 and 3. (2)

(b)The DNA base triplet that codes for **X** (2)

(6)

2.2 The diagram below represents the human male reproductive system.



2.2.1 Identify the parts labelled:

(a) **A** (1)

(b) **E** (1)

2.2.2 Explain the function of structure **G**. (2)

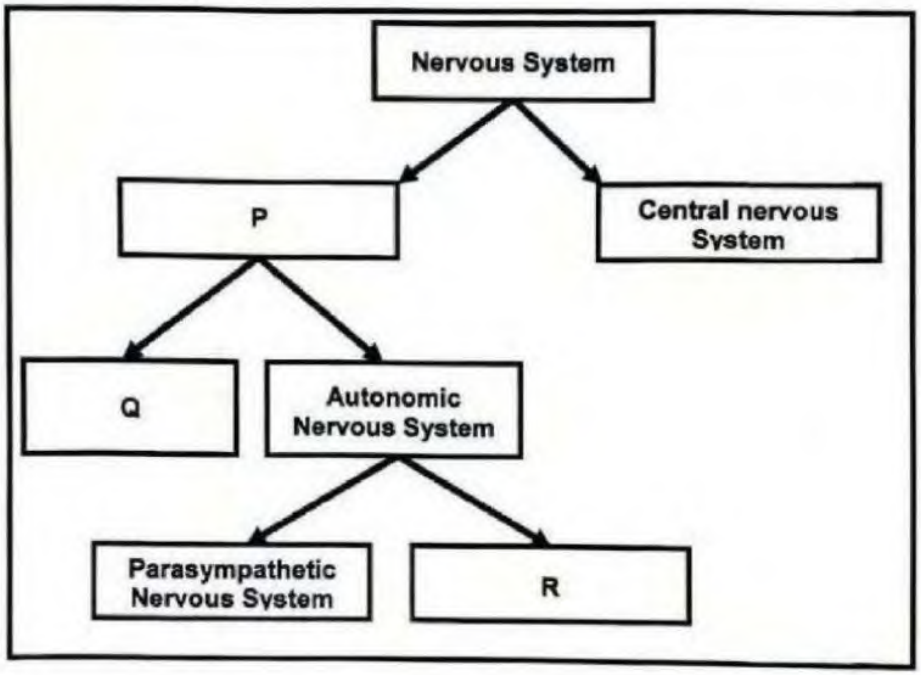
2.2.3 Name and describe the process by which gametes are produced in part **F**. (4)

2.2.4 Draw a diagram of a gamete produced in part **F**. (5)

2.2.5 Draw a flow diagram showing the pathway of sperm cells during ejaculation. (2)

(15)

2.3 The flow diagram below is based on the human nervous system.



2.3.1 Identify branch **P** of the nervous system which is made up of all the nerves outside the central nervous system. (1)

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

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

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

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

(11)

2.4 The back of the leopard frog *(Rana pipiens)* can be spotted or be without spots. Spotted frogs were allowed to interbreed and they produced 150 spotted offspring and 50 offspring without spots.

2.4.1 Which phenotype is dominant? (1)

2.4.2 Explain your answer to QUESTION 2.4.1. (2)

2.4.3 A frog that is heterozygous for spotted back was crossed with a frog without spots.

Using the letters **D** and **d**, represent a genetic cross to show the expected genotypes and phenotypes of the F_1 generation. (6) **(9)**

2.5 In rabbits, the genes for fluffy tails **(F)** are dominant over unfluffy tails **(f)**. Brown fur**(B)** is dominant over white fur **(b)**. Two rabbits which are heterozygous for both traits are crossed.
The Punnet diagram below shows the possible gametes produced by each parent.

	FB	**Fb**	**fB**	**fb**
FB	FFBB	**X**	FFBB	**Z**
Fb	FFBb	FFbb	FfBb	Ffbb
fB	FfBB	FfBb	ffBB	**Y**
fb	FfBb	Ffbb	ffBb	ffbb

2.5.1 (a) State the type of cross represented above. (1)

(b) Give a reason for your answer to QUESTION 2.5.1 (a). (1)

2.5.2 How many offspring have unfluffy tails and white fur? (1)

2.5.3 Give the genotype of the parent rabbits who were crossed. (1)

2.5.4 Identify the:

(a) Phenotype of offspring **X** (1)

(b) Genotype of offspring **Y** (1)

(c) Genotype of offspring **Z** (1)

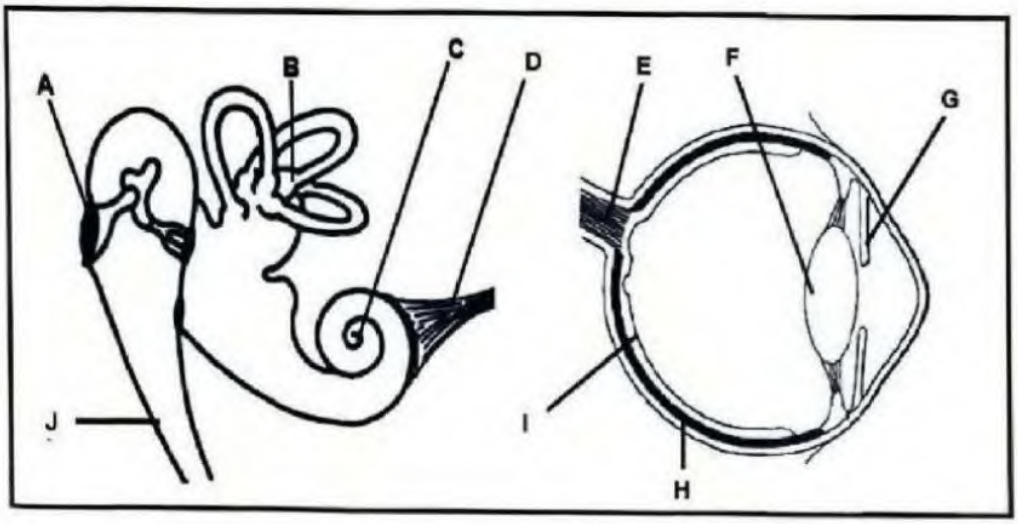
2.5.5 Give the proportion of offspring that could have fluffy tails. (2)

(9)

TOTAL QUESTION 2 [50]

QUESTION 3

3.1 The diagram below show part of a human ear and a human eye.



3.1.1 Write down TWO LETTERS only of the parts that:

(a) Carry impulses (2)

(b) Contain receptors (2)

3.1.2 State ONE function of parts:

(a) G (1)

(b) H (1)

(c) J (1)

3.1.3 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.

Describe the role of part(s):

(a) **B** in maintaining balance in Miss Candice Ndlovu (3)

(b) **A** to **C** in enabling her to hear (5)

(15)

3.2 Topsie did an investigation to determine the effect of distance on the curvature (thickness) of the lens of the human eye.

- She sat in a well–lit room
- She covered her one eye with an eye patch
- A pencil was held in front of her uncovered eye for 10 seconds • She focussed on the pencil until a clear image could be seen and at the same time the curvature of the lens of her eye was measured with an optical instrument
- The pencil was then moved to different distances from the eye and the curvature of the lens of the eye was measured each time

DISTANCE OF THE PENCIL FROM THE EYE (cm)	**CURVATURE OF THE LENS OF THE (mm)**
10	4.0
20	3.6
30	3.2
50	2.9
100	2.7
150	2.6
200	2.6

3.2.1 In this investigation identify

(a) The dependent variable. (1)

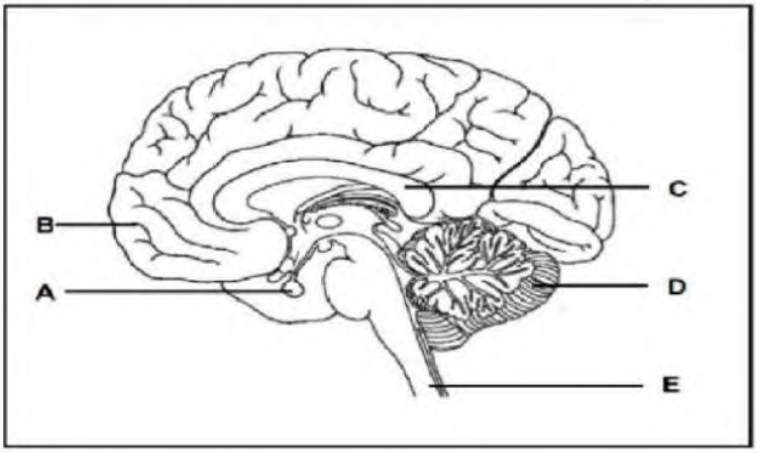
(b) The independent variable. (1)

3.2.2 State TWO factors that must be kept constant during the investigation (2)

3.2.3 Name TWO structures in the eye that are responsible for the changes in the curvature of the lens. (2)

(6)

Study the diagram below of the human brain.



3.3.1 Write the LETTER only of the part that:

(a) Interprets sound impulses (1)

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

(c) Produces prolactin (1)

3.3.2 Explain ONE effect of damage to:

(a) Structure **D** (2)

(b) Structure **E** (2)

3.3.3 Impulses are transmitted between the brain and the rest of the body by neurons.

(a) Explain ONE way in which the axon of a neuron is structurally suited to perform its function. (2)

(b) Draw a fully labelled diagram of a motor neuron. (5)
(14)

3.4 Workers in some factories are constantly exposed to loud noise for long periods. This can destroy the hair cells in the organ of Corti and damage the auditory nerve, resulting in hearing loss.
A survey was conducted in a developing country from 2014 to 2018, to establish the number of factory workers who suffered from hearing loss.

The results are shown in the table below.

Year	Number of factory workers with hearing loss
2014	85 000
2015	100 000
2016	115 000
2017	120 000
2018	130 000

3.4.1 Name the structure in the ear where the organ of Corti is located. (1)

3.4.2 Calculate the percentage increase in the number of factory workers with hearing loss between 2014 and 2018. Show ALL workings. (3)

3.4.3 State THREE reasons for the increase in the number of factory workers with hearing loss caused by exposure to loud noise in this country. (3)

3.4.4 Explain why damage to the auditory nerve may result in hearing loss. (2)

3.4.5 Draw a bar graph to represent the data in the table. (6)

[15]

TOTAL QUESTION 3 **[50]**

GRAND TOTAL : 150