LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
EDUCATION

MOGALAKWENA DISTRICT

NATIONAL SENIOR CERTIFICATE

GRADE 12

LIFE SCIENCES PRE-MIDYEAR EXAMINATION ASSESSMENT: 2023.

Stanmorephysics

TOTAL MARKS: 150
TIME: 2,5 HOURS

This question paper consists of 17 pages including the cover page.

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. Make 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			
QUESTION1			
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 1.1.10 D		
	1.1.1	During which of the following phases does DNA replication take place? A. Telophase B. Prophase C. Interphase D. Metaphase	2
	1.1.2	The term that describes nuclear division is known as… A. Gametogenesis B. Cytokinesis C. Karyokinesis D. Cytoclosis	2
	1.1.3	Which part of the human brain controls balance and equilibrium? A Cerebrum B Cerebellum C Medulla oblongata D Corpus callosum	2
	1.1.4	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 light intensity of the room in which the test was conducted. B height of the people. C age of the people in the sample. D distance between the tool used to test the sight and the person being tested.	2

	1.1.5	The data below represents the results of an investigation used to determine how the thickness of the lens changed as a pencil was moved away from the eye. **DISTANCE FROM EYE (cm)** / **THICKNESS OF LENS (mm)** 10 / 4,0 20 / 3,6 30 / 3,2 50 / 2,9 100 / 2,6 150 / 2,6 200 / 2,6 [Adapted from *Complete Biology*, 2000] The general conclusion that can be made from the data is that … A as the distance from the eye increased up to 100 cm, the thickness of the lens increased, after which it remained constant. B as the distance from the eye decreased, the thickness of the lens remained constant. C as the distance from the eye increased up to 100 cm, the thickness of the lens decreased, after which it remained constant. D the thickness of the lens increased with an increase in distance	2
	Questions 1.1.6 and 1.1.7 refer to the information below. In pea plants yellow seed colour (Y) is dominant over green seed colour (y). Smooth seed texture (S) is dominant over wrinkled seed texture (s). A student crossed a plant which had yellow wrinkled seeds with a plant which had green smooth seeds.		2
	1.1.6	Which ONE of the following shows possible alleles present in a gamete that is produced by the plant with yellow wrinkled seeds? A YYss B yySS C yS D Ys	2

	1.1.7	Which ONE of the following is a possible representation of the genotypes of the P_1 generation? A YYSS x yyss B Yyss x yySs C YYSS x yySs D Yyss x YySs	2
	1.1.8	The gland that acts as both exocrine and endocrine is the… A Pancreas B Thyroid gland C Adrenal gland D Mammary gland	2
	1.1.9	Which of the following CORRECTLY represents the events involved in the secretion and action of ADH(antidiuretic hormone)?	2
	1.1.10	Eggs or ova are produced in the… A Fallopian tubes B ovaries C uterus D vagina	2
		(10 X 2)	**(20)**

	WATER LEVEL IN BLOOD RELATIVE TO NORMAL	AMOUNT OF ADH PRODUCED RELATIVE TO NORMAL	AMOUNT OF WATER REABSORBED BY KIDNEYS
A	Increase	Increase	Decrease
B	Increase	Decrease	Increase
C	Decrease	Increase	Increase
D	Decrease	Decrease	Decrease

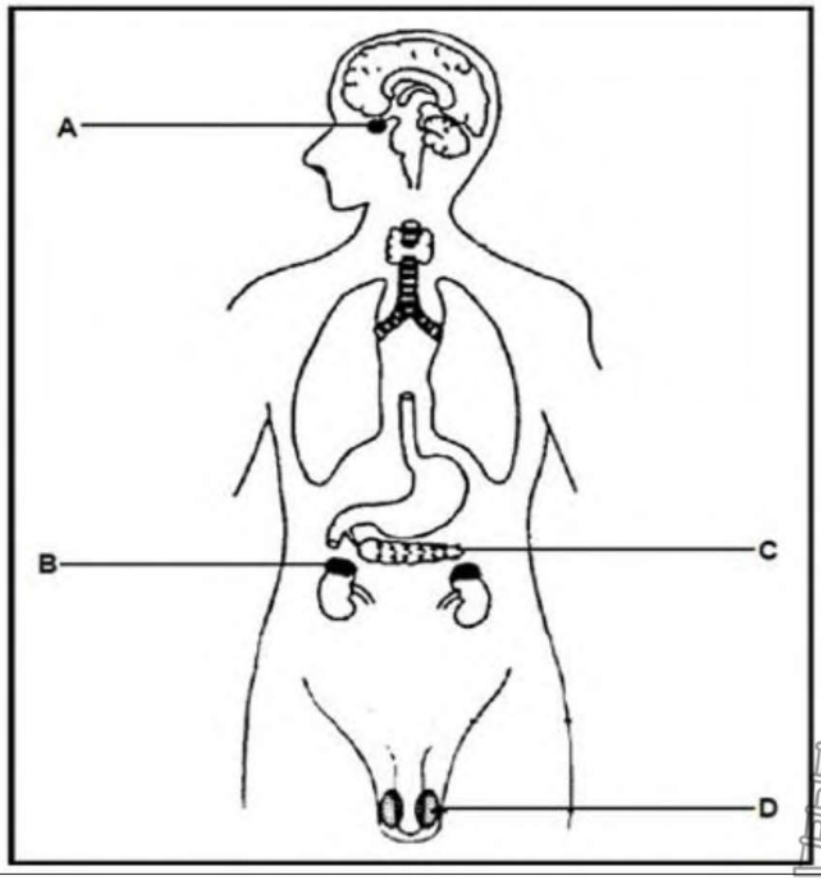
1.2	Give the correct biological term for each of the following descriptions. Write only the term next to the question number (1.2.1 to 1.2.8) in the ANSWER BOOK.		
	1.2.1	Mutual exhange of genetic information between homologous chromosomes at the chiasma	1
	1.2.2	The bag that contains the testes	1
	1.2.3	The inner wall of the uterus which is richly supplied with blood	1
	1.2.4	Site where sperms are stored in the male	1
	1.2.5	A chromosome number twice that of a gamete of a given species	1
	1.2.6	The type of cell division during which reduction of chromosomes takes place	1
	1.2.7	A rapid involuntary response to a stimulus	1
	1.2.8	Membrane like structures that surround the brain and spinal chord	1
		(8 X 1)	**(8)**

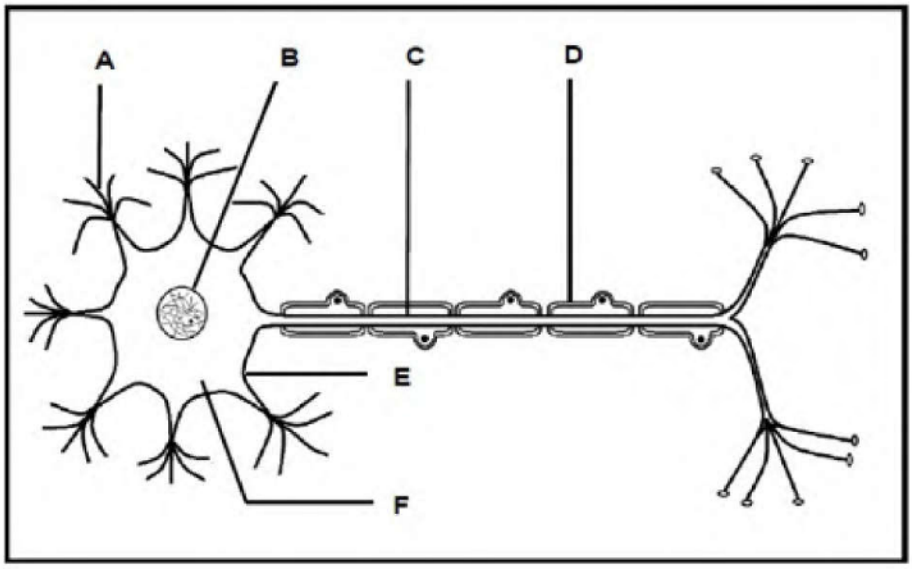
1.3 Indicate whether each of the descriptions in COLUMN I applies to A ONLY, B ONLY, BOTH A AND B or NONE of the items in COLUMN II. Write A only, B only, both A and B, or none next to the question number (1.3.1 to 1.3.3) in the ANSWER BOOK.

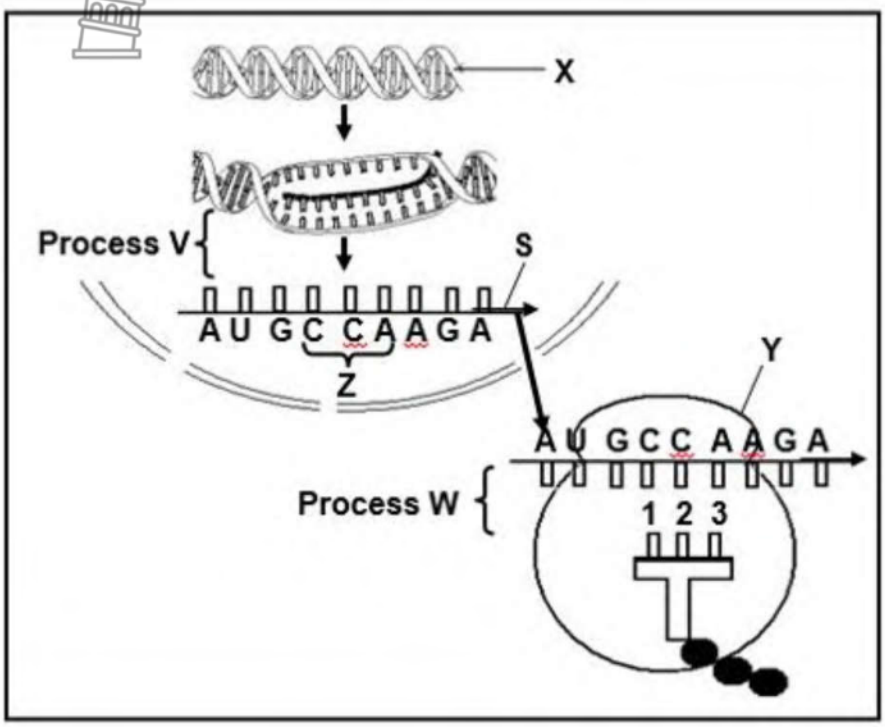
COLUMN I	COLUMN 11
1.31. Part of the female reproductive system where fertilisation takes place	A. Vagina B. Fallopian tube
1.3.2 Ejaculated from the male during copulation	A. Semen B. Amniotic fluid
1.3.3 Cells in the pancreas that secrete insulin	A. Thyroid B. Beta cells
1.3.4 Prepares the body for stress	A. insulin B. Adrenalin

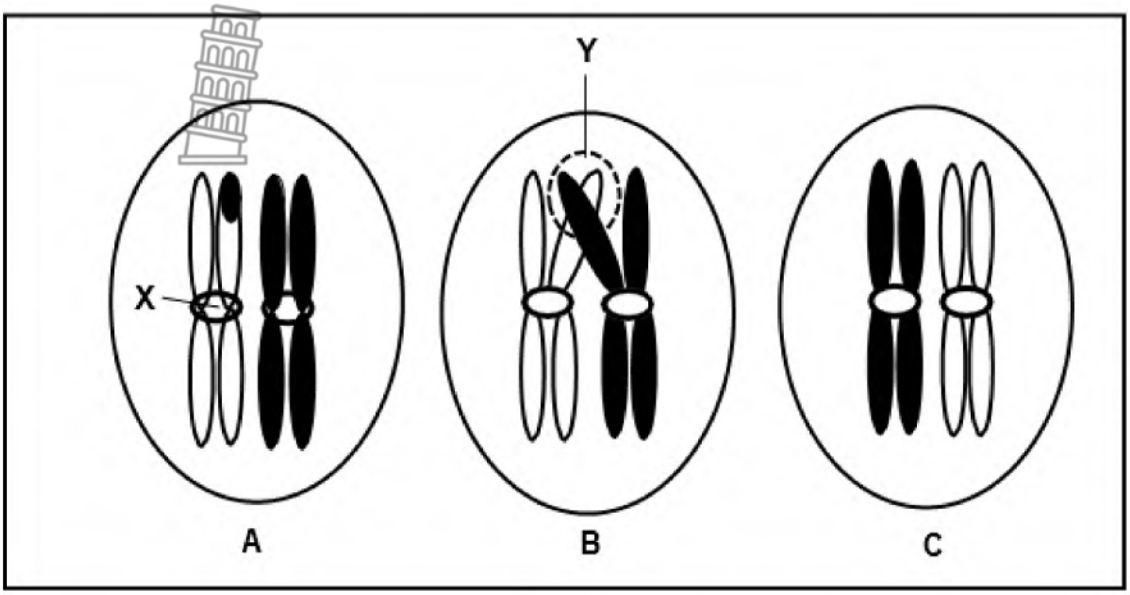
(4 x 2) **(8)**

1.4 The diagram below represents parts of the endocrine system in humans.



	1.4.1	Identify gland: (a) **A** (b) **B**	 1 1
	1.4.2	Give the LETTER and the NAME of the gland that secretes a hormone responsible for: (a) Starting puberty in males (b) Stimulating absorption of glucose by cells (c) Making the kidney tubules permeable to water	 2 2 2
			(8)
1.5	The diagram below represents the structure of a neuron. 		
	1.5.1	Name the type of neuron in the diagram above.	1
	1.5.2	Identify part: (a) **B** (b) **F** (c) **A**	 1 1 1
	1.5.3	Give the LETTER and the NAME of the part that transmits impulses away from the cell body	2
			(6)

		TOTAL SECTION A	**50**
SECTION B			
QUESTION 2			
2.1	The diagram below shows the process of protein synthesis.  		
	2.1.1	Identify the following: (a) Molecule **X** (b) Organelle **Y**	 1 1
	2.1.2	Identify the nitrogenous base labelled: (a) 1 (b) 3	 1 1
	2.1.3	Describe the role of DNA during transcription.	3
	2.1.4	Describe the part of protein synthesis shown as process **W**, which occurs at organelle **Y**.	4
	2.1.5	Describe the way in which protein synthesis would be affected by a gene mutation	5
			(16)

2.2	The diagrams below represent a chromosome pair in a female human cell. The cells (**A**, **B** and **C**) show different events in a phase of meiosis, which are not necessarily in the correct sequence.  		
	2.2.1	How many pairs of chromosomes occur in a normal human cell?	1
	2.2.2	Give labels for: (a) Structure **X** (b) Area **Y**	 1 1
	2.2.3	Name the organ in the human female where meiosis occurs.	1
	2.2.4	Name the: (a) Process occurring in diagram **B** (b) Phase represented by the diagrams above (c) Type of cells that would result from meiosis of this cell	 1 1 1
	2.2.5	Arrange the letters **A**, **B** and **C** to show the correct sequence of the events.	1
			(8)

2.3 In rabbits, black fur is produced by the allele (**B**) and white fur by the allele (**b**).

The table below shows the genotypes of some rabbits.

RABBIT	GENOTYPE
1	BB
2	Bb
3	bb

2.3.1 What is the phenotype:

(a) Produced by the recessive allele — 1

(b) Of rabbit **2** — 1

2.3.2 Give the NUMBER only (**1**, **2** or **3**) of the rabbit(s) that is/are:

(a) Pure-bred — 2

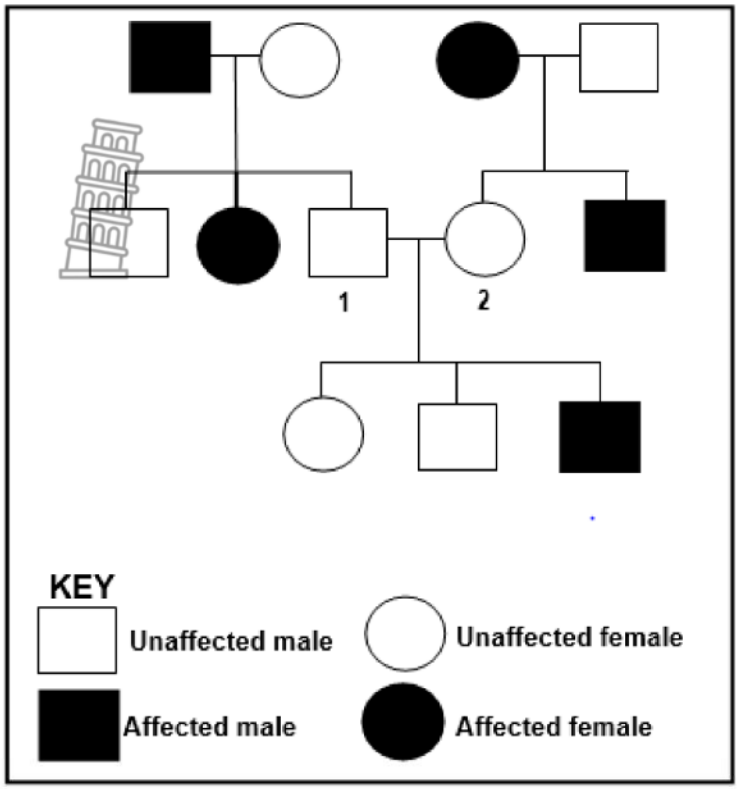
(b) Homozygous dominant — 1

2.3.3 Use a genetic cross to show the percentage chance of rabbits **1** and **3** having offspring with white fur. — 6

(11)

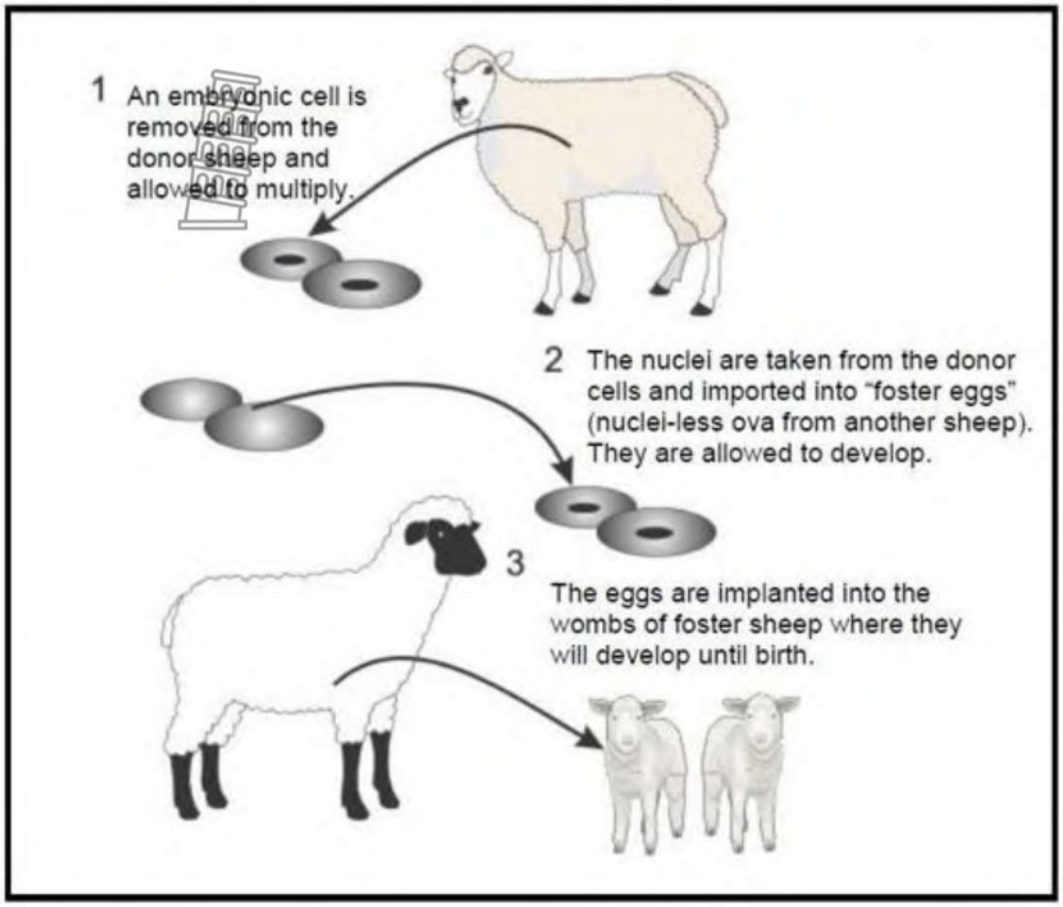
2.4 A lack of immunity to infections (agammaglobulinemia) is a sex-linked recessive genetic disorder in humans. The dominant allele is represented by $\mathbf{X^A}$ and the recessive allele is represented by $\mathbf{X^a}$.

An individual with the disorder is described as affected and an individual without it is described as unaffected. The pedigree diagram below illustrates inheritance of this disorder.



	2.4.1	Name the genotypes of individuals: (a) 1 (b) 2	 2 2
	2.4.2	What percentage of the males in this pedigree diagram is affected? Show ALL working.	2
	2.4.3	Explain why any son of an affected female will always have this disorder.	3
			(9)

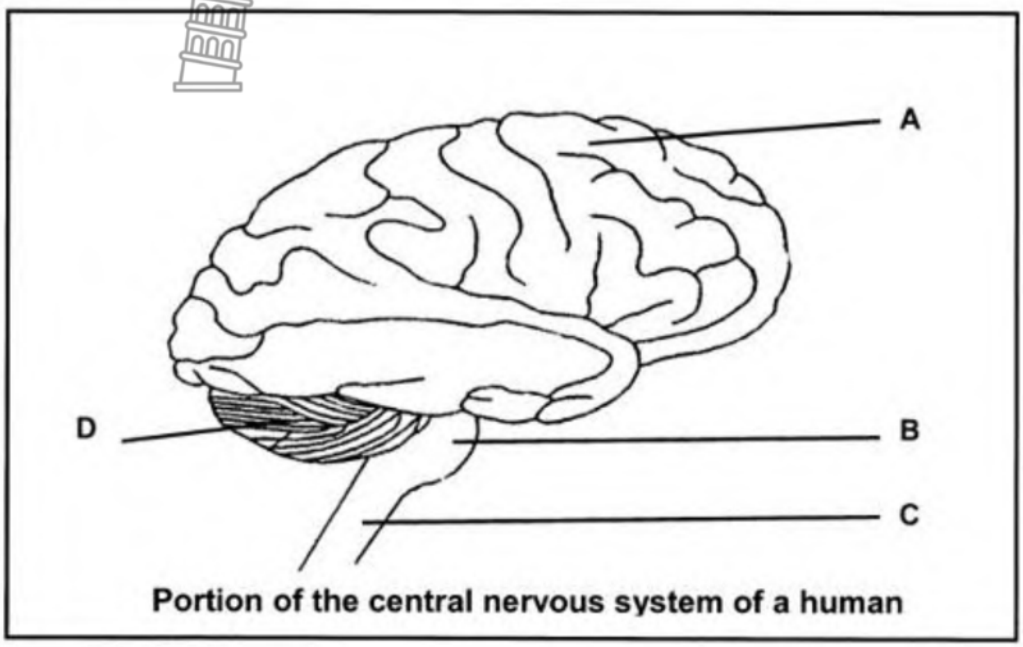
2.5 The diagram below shows one method of cloning sheep.



2.5.1	Explain why the lambs produced by this technique are identical to each other.	2
2.5.2	Explain why the lambs are not genetically identical to the sheep which produced the "foster" eggs.	2
2.5.2	Describe how cloning in animals or plants can be beneficial to humans	2
		(6)
		[50]

QUESTION 3

3.1 The diagram below represents a portion of the central nervous system of a human.

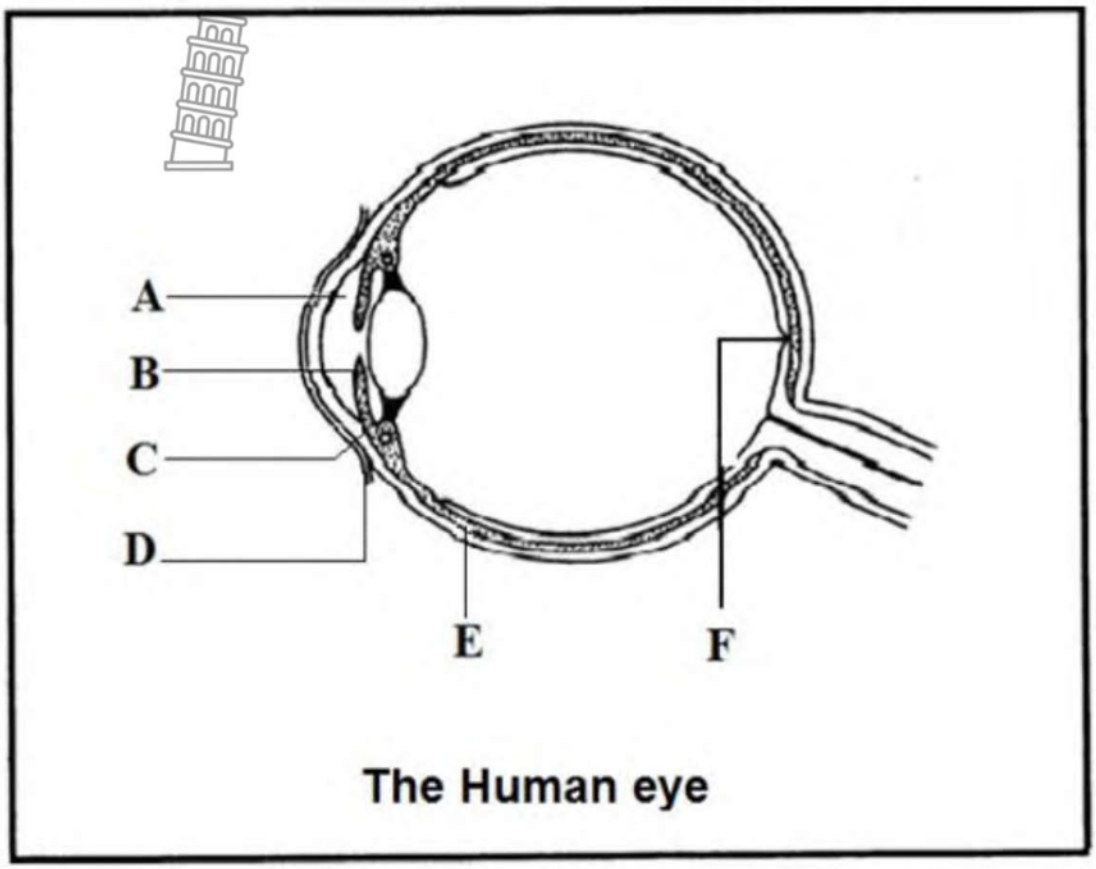


Portion of the central nervous system of a human

Give the LETTER and the NAME of the part responsible for each of the following:

3.1.1	Regulation of breathing	2
3.1.2	Origin of voluntary actions	2
3.1.3	Maintenance of balance and equilibrium	2
		(6)

3.2	Study the diagram that represents the human eye and answer the questions that follow.		

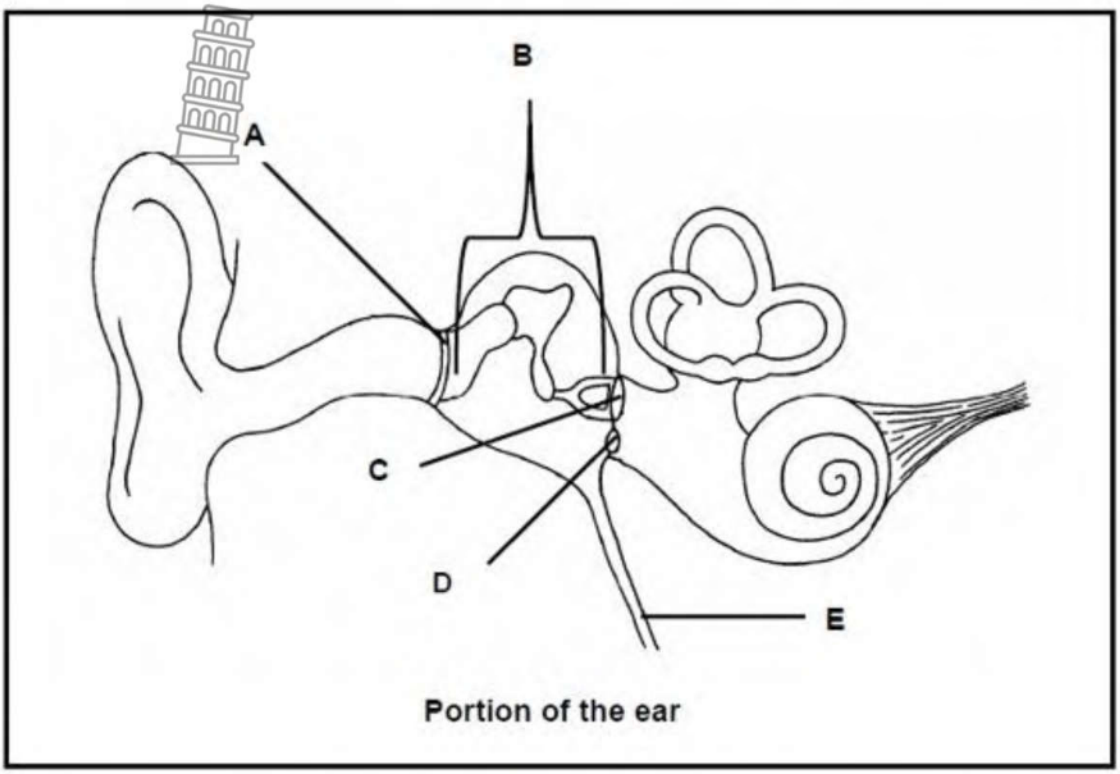


The Human eye

Write down the letter and name of each of the following.

3.2.1	Liquid that helps to keep the shape of the cornea.	2
3.2.2	Area where the clearest image is formed.	2
3.2.3	Part of the eye responsible for the colour of the eye.	2
		(6)

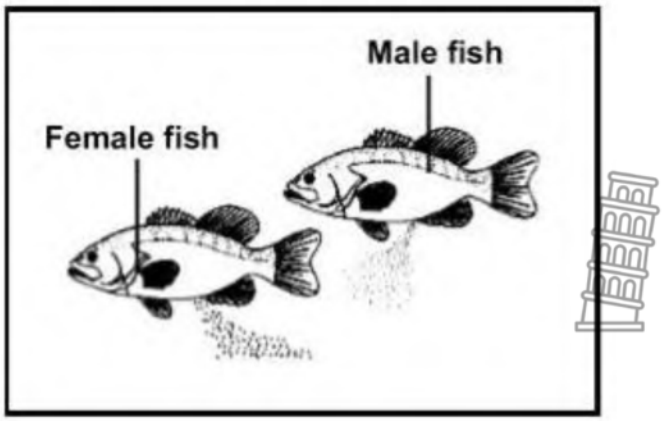
3.3 Study the diagram below showing a portion of the human ear and answer the questions that follow.

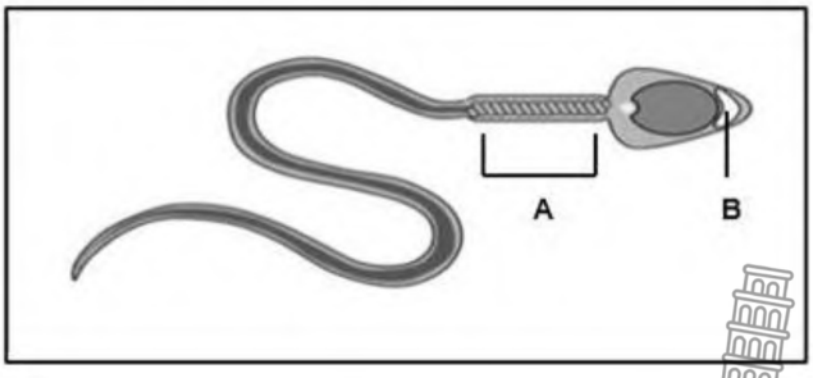


Portion of the ear

3.3.1	Provide labels for parts **A**, **C** and **D**, respectively.	3
3.3.2	State ONE function for parts **B** and **D**, respectively.	2
3.3.3	How are parts **A** and **C** together suited for the amplification of sound?	2
3.3.4	Explain what would happen if part **E** is blocked with mucus.	2
		(9)

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



	3.4.1	Identify the type of fertilization displayed by the fish species.	1
	3.4.2	State TWO visible ways in which the chances of fertilisation in these fishare increased.	2
	3.4.3	Give TWO reasons why there is no need for then eggs of these fish to be covered by a hard or leathery shell	2
			(5)
3.5	An investigation was conducted to determine the relationship between the ages of women, the number of pregnancies per month and the chances of miscarriages. The results of the investigation are shown in the table below. **AGES OF WOMEN** / **PREGNANCIES PER MONTH (%)** / **MISCARRIAGES (%)** 22 / 25 / 10 28 / 24 / 11 34 / 18 / 15 40 / 6 / 24 46 / 2 / 50 [Adapted from http://www.children.gov.on.ca]		
	3.5.1	Draw a line graph to show the relationship between the ages of the women and the percentage of pregnancies per month.	6
	3.5.2	Describe the relationship that exists between the ages of women and the chances of them miscarrying.	2
			(8)
3.6	The diagram below represents a sperm.  		
	3.6.1	Label part **A** and **B**	2
	3.6.2	Explain TWO ways in which the sperm is adapted to ensure effective movement towards the Fallopian tubes.	4
			(6)

3.7	An investigation was done to determine the effect of different amounts of thyroxin on body weight in rats. The procedure was as follows: • 45 healthy female rats of the same species were used. • They were divided into three groups of 15 each (Groups A, B and C). • Their average body weight was determined and recorded. • Group A was injected daily with methimozole which inhibits the production of thyroxin in rats. • Group B was injected daily with DL-thyroxin which stimulates the production of more thyroxin than under normal conditions in rats. • Group C was given no treatment. • All three groups were exposed to the conditions above for 2 months. • The average body weights of all the groups were determined weekly.		
	3.7.1	In the investigation identify the: (a) Independent variable (b) Dependent variable	 1 1
	3.7.2	State THREE factors that were kept constant during the investigation.	3
	3.7.3	Which group of rats (**A**, **B** or **C**) would be expected to gain the most weight?	1
	3.7.4	Explain your answer to QUESTION 3.7.3	3
	3.7.5	In which group of rats (**A**, **B** or **C**) would the levels of TSH in the blood be low?	1
			(10)
			[50]
		GRAND TOTAL	**150**