LIMPOPO

PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
EDUCATION

NATIONAL

SENIOR CERTIFICATE

GRADE 12

LIFE SCIENCES

JUNE EXAMINATION 2026

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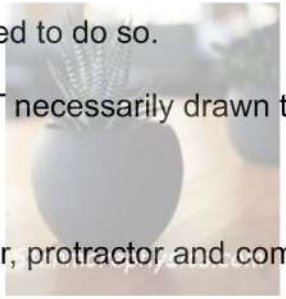
This question paper consists of 21 pages including the cover page

NSC

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. Answer ALL the questions.
2. Write ALL the answers in your 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. ALL drawings should be done in pencil and labelled 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 compass.
11. Write neatly and legibly.



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SECTION A

QUESTION 1

1.1. Various options are provided as possible answers to the following. Choose the correct answer and write only the letter (A-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. Which phase of meiosis results in genetic variation due to crossing over?

A Prophase I
B Metaphase I
C Anaphase I
D Prophase II

1.1.2. Which ONE of the following terms CORRECTLY matches its description?

A Ejaculation – fusion of an egg cell and a sperm cell.
B Fertilisation – release of semen from the penis.
C Gestation – embedding of a fertilised ovum.
D Ovulation – release of an egg cell from the ovary.

1.1.3. The difference between a nucleic acid and a nucleotide is that

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 that nucleic acids

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1.1.4. The type of reproduction in which the young develop from the eggs that are kept inside the mother's body and receive nutrients from the yolk in the egg is…

A ovipary.
B vivipary.
C parental care.
D ovovivipary.

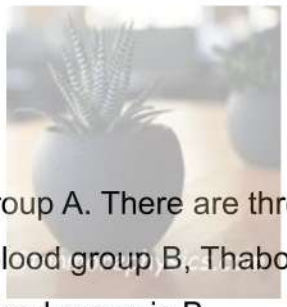
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1.1.5. A mistake occurs during Anaphase 1 when homologous chromosomes fail to separate, what will be the results in the gametes produced?

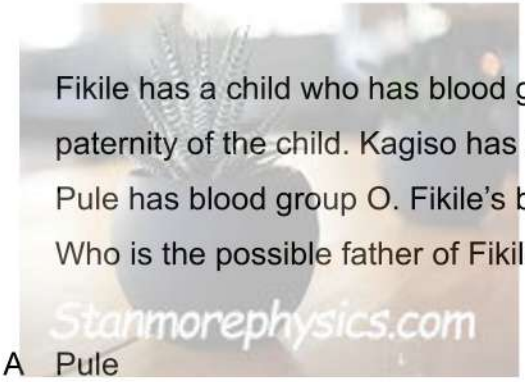
A All gametes will be identical
B Gametes will have an abnormal number of chromosomes
C Gametes will have double the DNA but normal chromosomes
D No gametes will be produced

1.1.6. Which ONE of the following structures stores sperm cells temporarily in the male reproductive system?

A Cowper's gland
B Scrotum
C Epididymis
D Seminal vesicles



1.1.7. Fikile has a child who has blood group A. There are three men who are claiming paternity of the child. Kagiso has blood group B, Thabo has blood group AB and Pule has blood group O. Fikile's blood group is B.
Who is the possible father of Fikile s child?



A Pule
B Thabo
C Kagiso
D None of the above

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1.1.8. After playing in a soccer match the players often go into a steam room to relax their muscles. The average temperature in the steam room is 41°C and the humidity is between 80% and 100%.

Which of the following explain why players are advised NOT to stay in a steam room for longer than 15 minutes?

A Sweat will not evaporate causing overheating.

B Vasoconstriction will lower sweat production.

C Heat receptors in the skin will be damaged.

D Increased sweating will cause overheating.

1.1.9. Study the table below, showing various amino acids coded for by various mRNA codons

Codons	Corresponding amino acids
GCG	Alanine
AUG	Methionine
AUA	Isoleucine
AGG	Arginine
Which amino acid is coded for by the DNA basetriplet of nitrogenous bases TAC?	

A Alanine

B Arginine

C Isoleucine

D Methionine

1.1.10. Which ONE of the following is associated with the hormone adrenalin?

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(i) Increases the metabolic rate in the body cells

(ii) Increases the rate of the heartbeat

(iii) Decreases the breathing rate

(iv) Stimulates the conversion of glycogen to glucose

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

B (ii) and (iii) only

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

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

(10x2) **(20)**



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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 1.2.10) in your ANSWER BOOK.

1.2.1. A condition in which one allele is dominant and the other is recessive, such that the effect of the recessive allele is masked by the dominant allele in the heterozygous state.

1.2.2. A disorder caused by the degeneration of the myelin sheath of a neuron.

1.2.3. The random arrangement of homologous chromosome pairs during Metaphase I, resulting in genetic variation.

1.2.4. The blood vessel in the umbilical cord that transports nutrients to the foetus.

1.2.5. Different expressions of a gene found on the same locus on homologous chromosome.

1.2.6. The lining of the uterus which is richly supplied with blood vessels.

1.2.7. Chromosome condition describing the presence of a single set of chromosomes in a cell.

1.2.8. The hormone secreted by the islets of Langerhans that increase the glucose level of the blood.

1.2.9. A membrane in vertebrates that stores wastes produced by the embryo.

1.2.10 A quick, automatic response to a stimulus, which is not under conscious control.

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

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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 1.3.3) in the ANSWER BOOK

	COLUMN I	**COLUMN II**
1.3.1.	The bond between two nitrogenous bases	A: Hydrogen bond B: Peptide bond
1.3.2.	Development in birds where the hatchlings can move soon after being born	A: Precocial B: Altricial
1.3.3.	The gland in the human body that has an exocrine and an endocrine function	A: Pituitary gland B: Pancreas

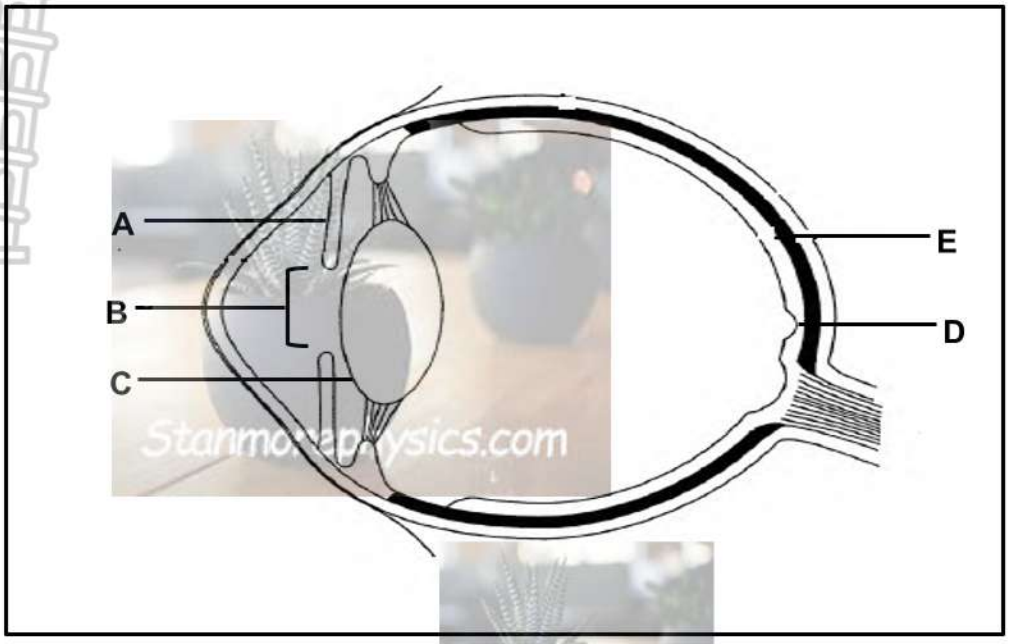
(3x2) **(6)**

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1.4. The diagram below represents a human eye



1.4.1 Identify part:

(a) B (1)

(b) E (1)

1.4.2 Give the LETTER and NAME of the part that:

(a) Regulates the amount of light entering the eye. (2)

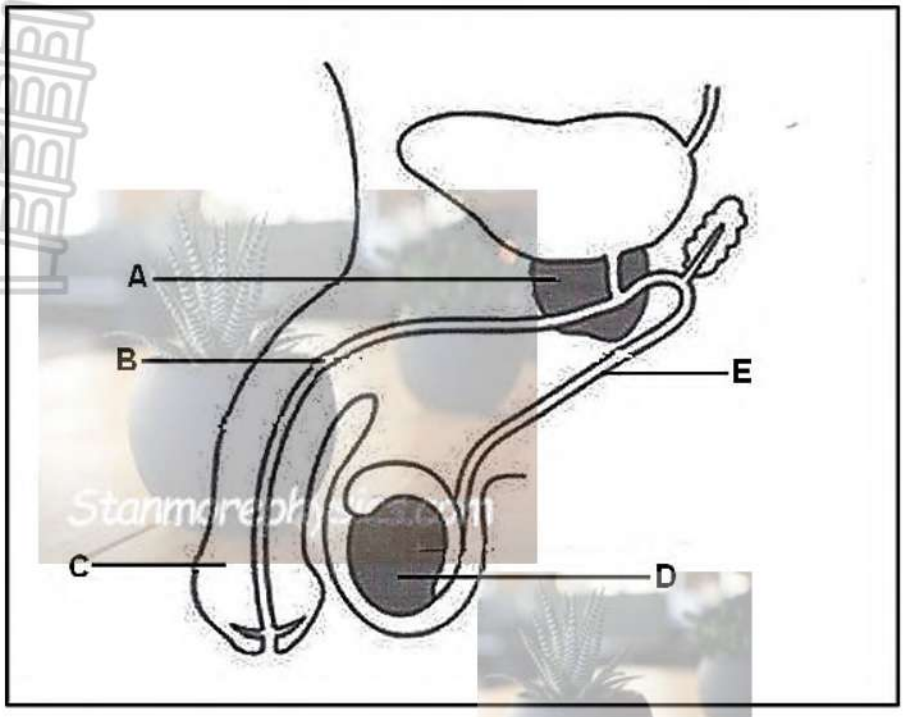
(b) Contains receptors that are sensitive to light. (2)

1.4.3 Give the LETTER of the part that can alter its shape to accommodate for near and distant vision. (1)

(7)

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1.5. The diagram below represents the male reproductive system



1.5.1 Identify part:

(a) **A** (1)

(b) **E** (1)

1.5.2 Give the LETTER and NAME of the part that:

(a) Transports semen to the outside of the body. (2)

(b) Secretes a hormone that is responsible for the development of secondary sexual characteristics during puberty. (2)

1.5.3 Name the type of gametogenesis that occurs in part D. (1)

(7)

[50]

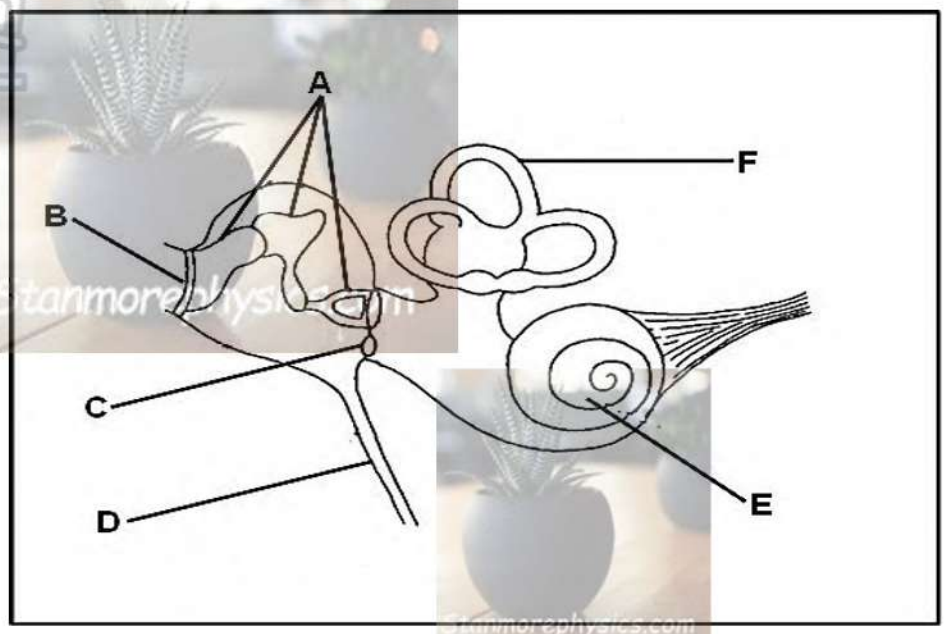
TOTAL SECTION A: 50

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SECTION B

QUESTION 2

2.1. The diagram below represents a part of the human ear



2.1.1 Identify part:

(a) **D** (1)

(b) **E** (1)

2.1.2. .Give ONE function of part **C**. (1)

2.1.3. Explain why a person taking off in an aeroplane may experience some discomfort in the ears, and how this may be relieved by swallowing or yawning. (5)

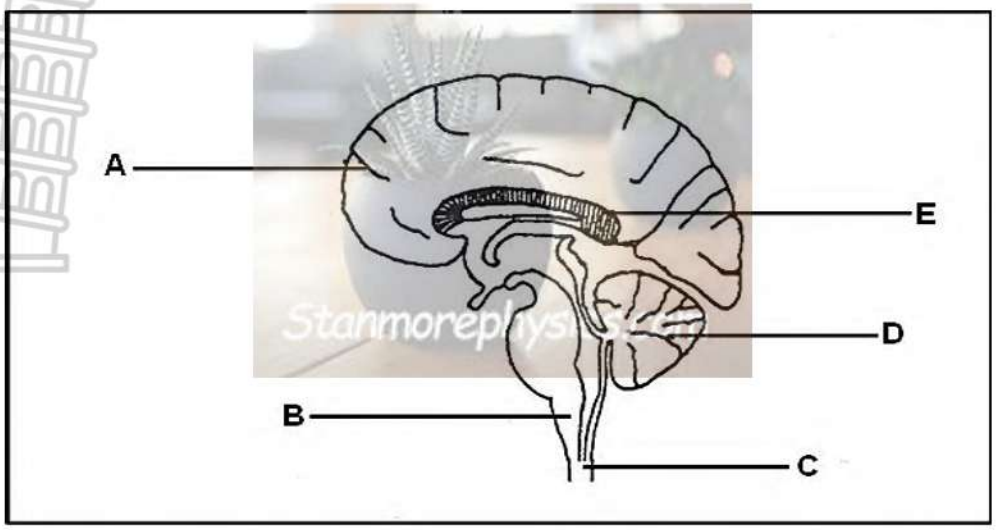
2.1.4. Describe how the parts represented by **A,** including the membranes in the middle ear assist with amplifying sound. (3)

2.1.5. Describe the role of part **F** in maintaining balance. (5)

(16)

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2.2. The diagram below represents the central nervous system.



2.2.1 Identify part:

(a) **B** (1)

(b) **C** (1)

2.2.2 Name the part of the brain that interpret what you see. (1)

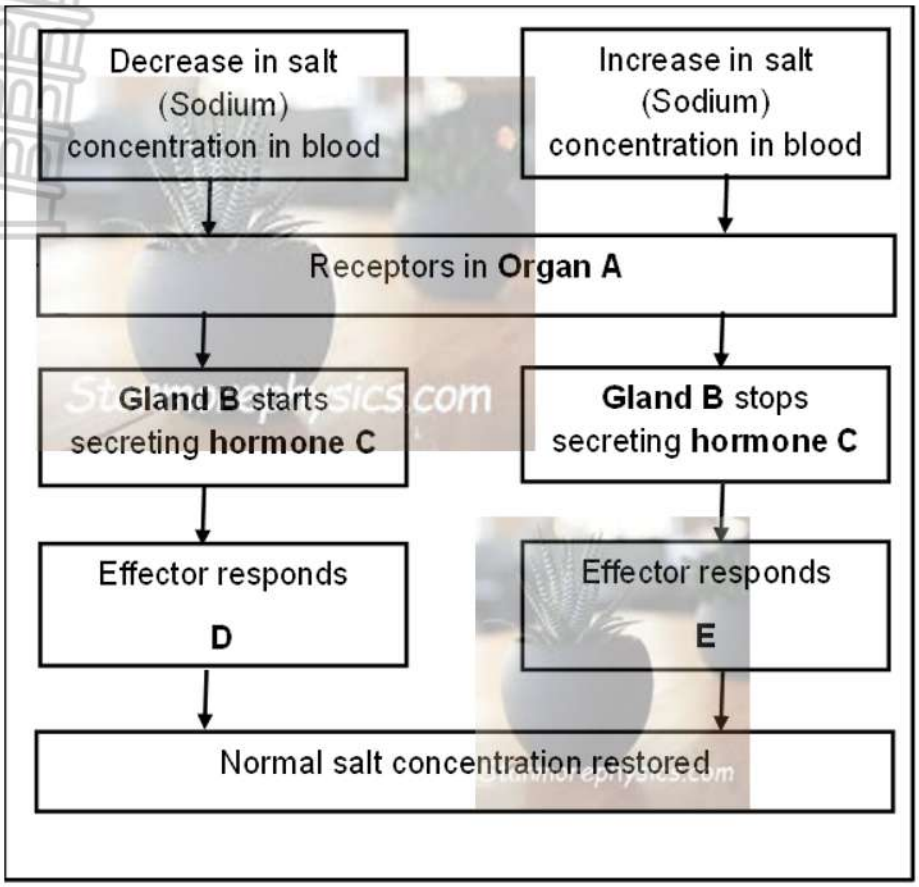
2.2.3 State TWO functions of part **E**. (2)

2.3 Describe the structure and the functioning of the autonomic nervous system. (5)

(10)

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2.4 The flow diagram below shows the homeostatic mechanism used to regulate the concentration of salts in the human body.



2.4.1 Give the name of the following:

(a) Organ **A** (1)

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

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

2.4.2 Describe the response by the effector **D**. (3)

(6)

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2.5

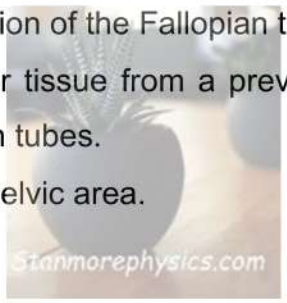
Read the extract and look at the diagram below that shows a female reproductive system

ECTOPIC PREGNANCIES

An ectopic pregnancy occurs when a fertilized egg implants outside the uterus, most commonly in a fallopian tube but implantation can also occur on the ovaries, in the cervix or in the abdominal cavity. This causes serious health risk due to potential rupture of the fallopian tubes and severe internal bleeding. The embryo usually cannot survive.

Ectopic pregnancies are caused by one or more of the following:

- An infection or inflammation of the Fallopian tubes.
- The development of scar tissue from a previous infection or surgical procedure in the fallopian tubes.
- Previous surgery in the pelvic area.



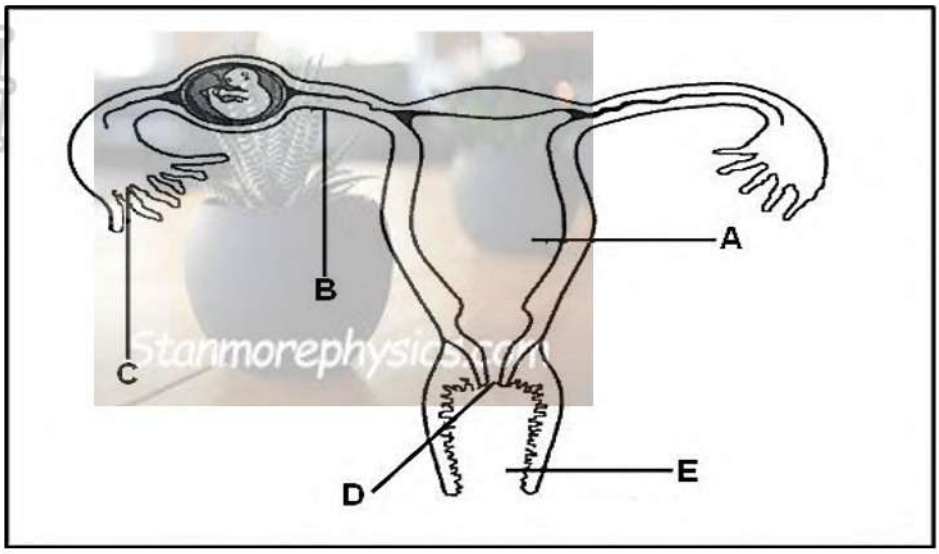
The warnings include:

- Vaginal bleeding: lighter, heavier or darker than normal.
- Abdominal/Pelvic pain

In most cases the Fallopian tube has to be removed surgically

to save the woman's life.

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2.5.1 Give only the LETTERS of TWO parts in the diagram where implantation of the embryo may occur during ectopic pregnancy. (2)

2.5.2 Name TWO symptoms of ectopic pregnancy from the passage. (2)

2.5.3. Give THREE reasons why the embryo may not be able to survive during an ectopic pregnancy inside the Fallopian tube. (3)

2.5.4. Explain why women who had surgery on the fallopian tubes have a greater risk of experiencing an ectopic pregnancy. (2)

(9)

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2.6 The table below shows how body temperature is regulated by the hypothalamus by influencing heat production and heat loss.

BODY TEMPERATURE (^{o}C)	HEAT PRODUCTION (joules per second)	HEAT LOSS (joules per second)
36,4	320	5
36,6	260	5
36,8	150	35
36,9	90	90
37,0	90	100
37,2	90	180
37,4	90	310

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2.6.1 State whether the blood vessels that supply blood to the skin are constricted or dilated when the body temperature is at 36,6 ^{o}C. (1)

2.6.2 Explain the role of the diameter of the blood vessels for your ANSWER in 2.6.1. (3)

2.7 TSH and thyroxin are both secretions of the endocrine glands, the pituitary and the thyroid gland respectively.

2.7.1 Where will you look for the evidence to detect the levels of TSH and thyroxin in the human body? (1)

2.7.2 A high level of TSH is detected in the human body.
Explain TWO possible causes of high levels of TSH in the body. (4)

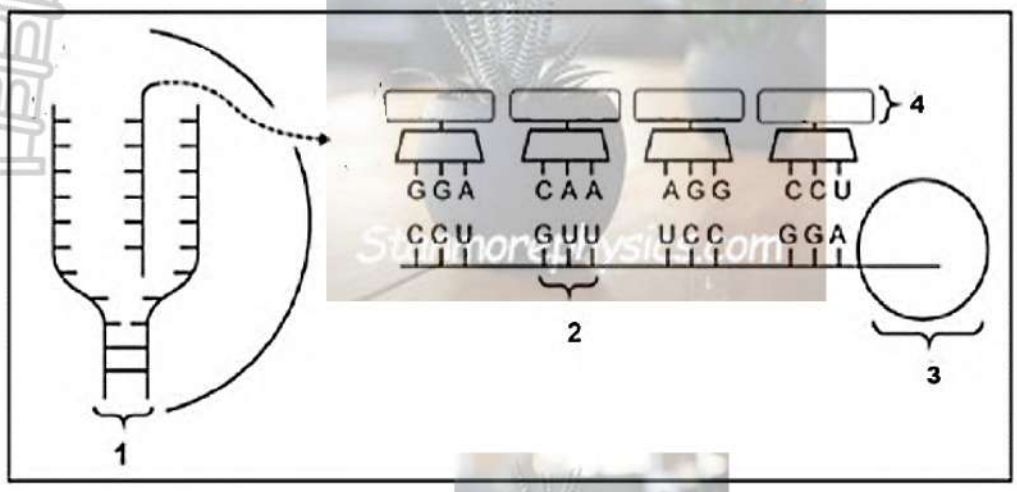
(9)

[50]

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QUESTION 3

3.1. The diagram below represents two stages of protein synthesis.



3.1.1 Identify the following:

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

(b) Organelle **3** (1)

3.1.2 Give only the number of the part which represents a:

(a) monomers of protein (1)

(b) Codon (1)

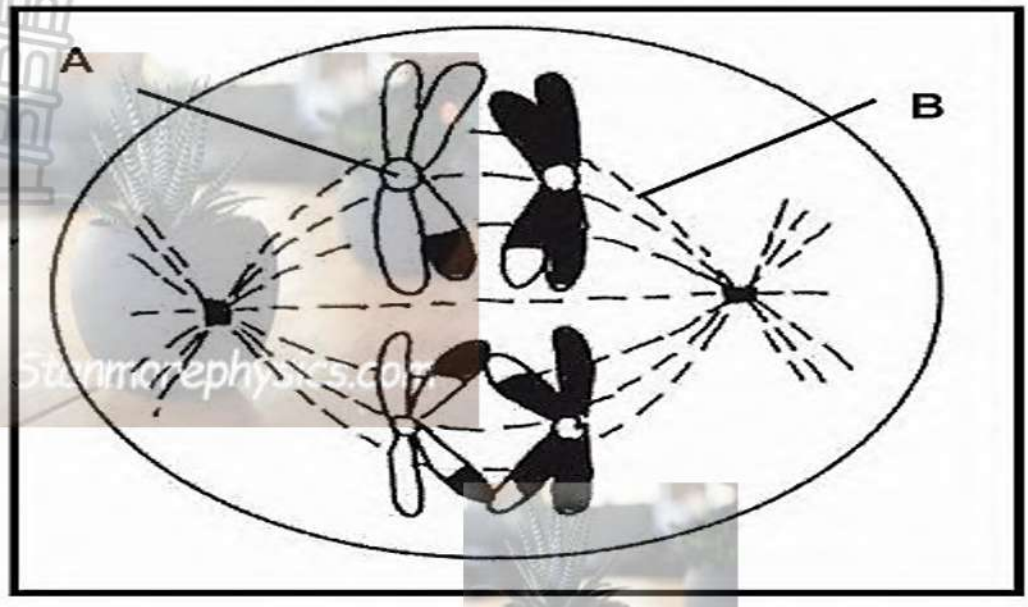
3.1.3. Name and describe the process shown in the diagram as it occurs in organelle **3.** (6)

3.1.4. State ONE difference between a **DNA** nucleotide and **RNA** nucleotide. (2)

(12)

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3.2. The diagram below represents an animal cell in a phase of meiosis.



3.2.1 Give the functions of parts labelled:

(a) **A** (1)

(b) **B** (1)

3.2.2 Which phase of meiosis is represented in the diagram? (1)

3.2.3 Name the phase that follows the one mentioned in question 3.2.2 above. (1)

3.2.4 Name the process that accounts for the genetic variation represented in the diagram. (1)

3.2.5 Provide the number of:

(a) Chromosomes that are present in the cell above. (1)

(b) Chromosomes that will be present in each cell at the end of meiosis. (1)

(c) Daughter cells will be present at the end of meiosis. (1)

3.2.6 Name the process that makes the chromosomes to be double stranded. (1)

(9)

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3.3. Two researchers, Regie and Marieth, carried out separate investigations into the variation in the height of sunflower plants that were planted in a field on 8 March 2020

Regie's procedure was as follows

- The investigation was done on 14 April 2022.
- The sunflower plants were taken from 20 randomly selected areas.
- The sunflower plants that were measured were selected at random.
- The heights of 10 plants were measured in each of the selected areas.

Marieth 's procedure was as follows

- The investigation was carried out on 24 April 2022.
- The sunflower plants were taken from 20 randomly selected areas.
- The sunflower plants that were measured were selected at random.
- The heights of 5 plants were measured in each selected area.

The results of both Regie and Marieth's investigations are shown in the table below

Height interval(cm)	Number of sunflower plants	
	Regie	Marieth
51-55	25	15
56-60	45	20
61-65	40	30
66-70	55	25
71-75	35	10

3.3.1 Explain why the plants were selected at random. (2)

3.3.2. Name TWO environmental factors that might have contributed to the variation in the height of the sunflower plants. (2)

3.3.3 Give a reason why Regie 's results can be said to be more reliable. (2)

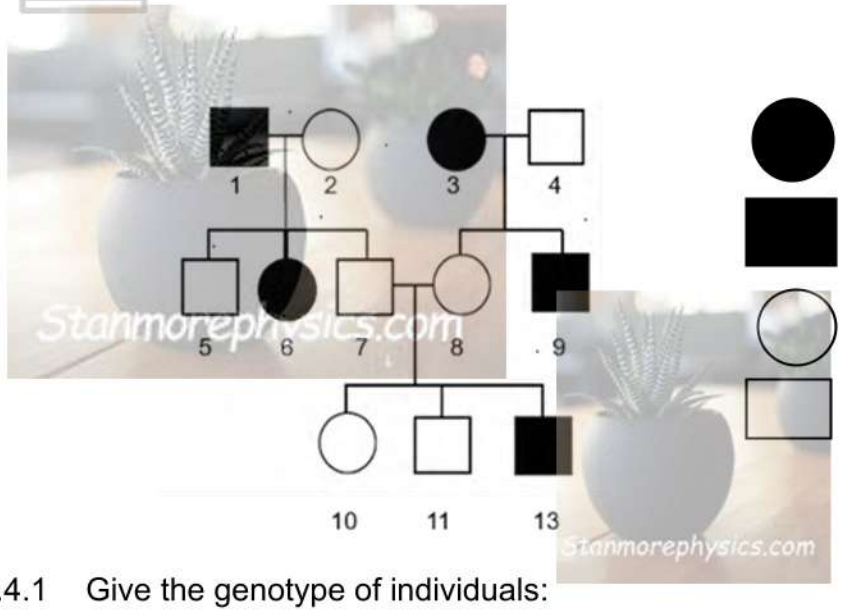
3.3.4 Draw a histogram to illustrate Regie' s results. (6)

(12)

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3.4. Lesch–Nyhan Syndrome – Purine metabolism is a genetic condition that causes gout, neurological issues, and self-injurious behavior in humans. It is caused by recessive allele on the X chromosome (X^a).

The pedigree diagram below shows the inheritance of Lesch–Nyhan Syndrome – Purine metabolism in a family.



3.4.1 Give the genotype of individuals:

(a) **1** (1)

(b) **4** (1)

3.4.2. What percentage of the males in this pedigree diagram is living with Lesch–Nyhan Syndrome – Purine metabolism. Show ALL workings. (2)

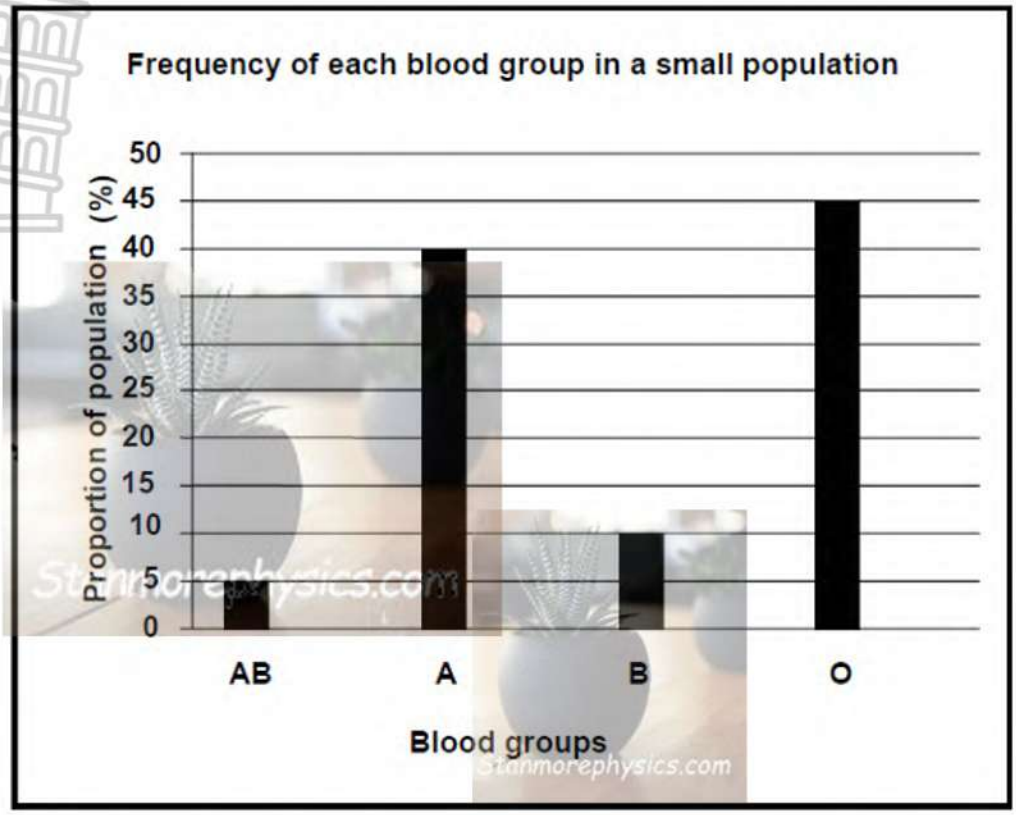
3.4.3 How many offsprings do parents 7 and 8 have? (1)

3.4.4 Explain why any son of a female living with Lesch–Nyhan Syndrome – Purine metabolism always has this disorder. (3)

(8)

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3.5. The graph below shows the results of an investigation into the frequency of blood groups in a small human population.



3.5.1 Which blood group has the lowest frequency in the population investigated? (1)

3.5.2. How many times more often would you find people with blood group A compared to blood group B in this portion of a human population. (2)

3.5.3. Which allele is the least frequent in this population? (1)

3.5.4 Explain your answer to QUESTION 3.5.3. (2)

3.5.5 Explain why most people in this population have blood group O. (3)

(9)

[50]

TOTAL SECTION B: 100

GRAND TOTAL: 150

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MID YEAR EXAMINATION ERRATA

MARKS:

Question 3.1: Allocation of marks is CORRECT

Question 3.2: Allocation of marks is CORRECT

Question 3.3:

3.3.3 is **TWO** marks

Total for question 3.3 is **12** marks not **11 marks**

3.4:

3.4.1 (a) ONE Mark

(b) ONE mark



Total for question 3.4 is **8** marks not **10 marks**

3.5:

3.5.2: Two marks

Total marks 9 not 8

QUESTION 3 TOTAL: **12+9+12+8+9 = 50**

SECTION A

Question 1.2.5. Alleles

SECTION B

Question 2.5.1. B,C,D

Question 3.3.4 **GRAPH**

When marking the graph

1. Follow the marking rubric
2. For a wrong type of graph:
    - No mark for the correct graph
    - Mark what is correct.