



LIMPOPO

PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
EDUCATION

NATIONAL
SENIOR CERTIFICATE

GRADE 12 *s.com*

LIFE SCIENCES
JUNE EXAMINATION 2026

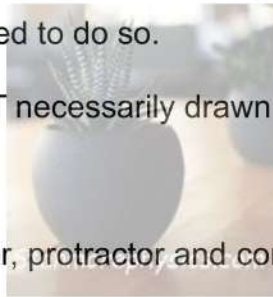
Stanmorephysics.com

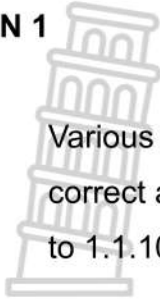
This question paper consists of 21 pages including the cover page

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. Answer ALL the questions.
2. Write ALL the answers in 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.



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

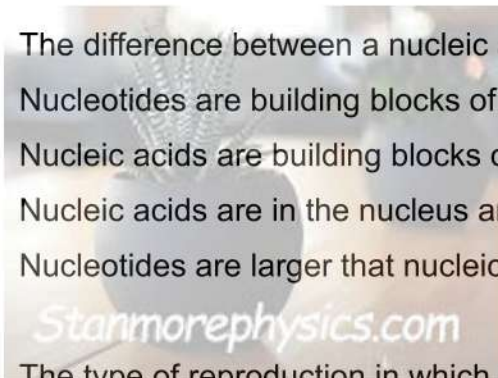
1.1.2. Which ONE of the following terms CORRECTLY matches its description?

- 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 than nucleic acids



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.

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

- 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 basetriples 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?

- 
- (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)**



- 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)**

- 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

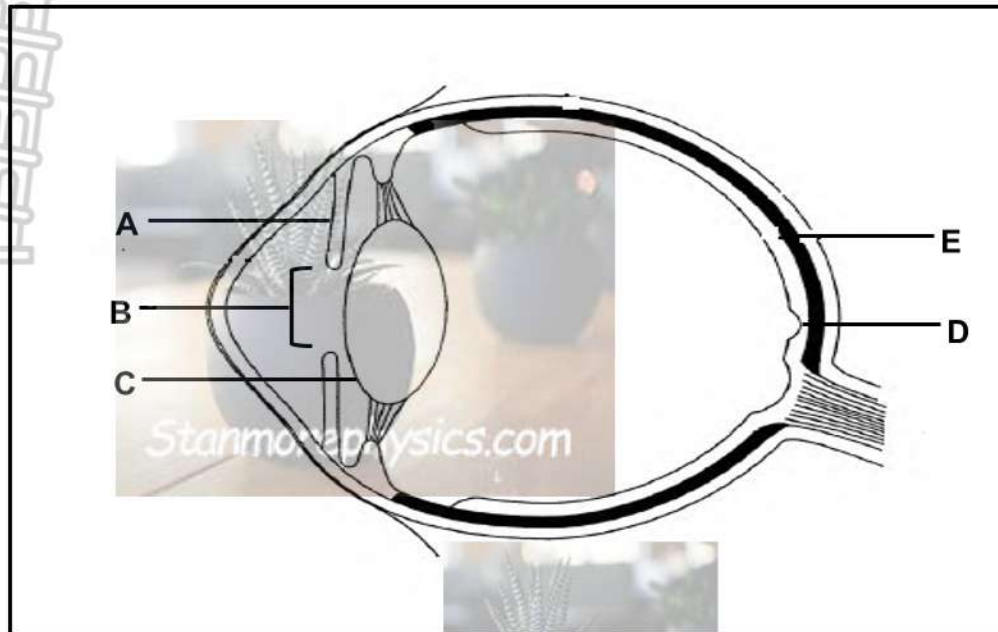
- 1.3.1. The bond between two nitrogenous bases
- 1.3.2. Development in birds where the hatchlings can move soon after being born
- 1.3.3. The gland in the human body that has an exocrine and an endocrine function

COLUMN II

- A: Hydrogen bond
B: Peptide bond
A: Precocial
B: Altricial
A: Pituitary gland
B: Pancreas

(3x2) **(6)**

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.

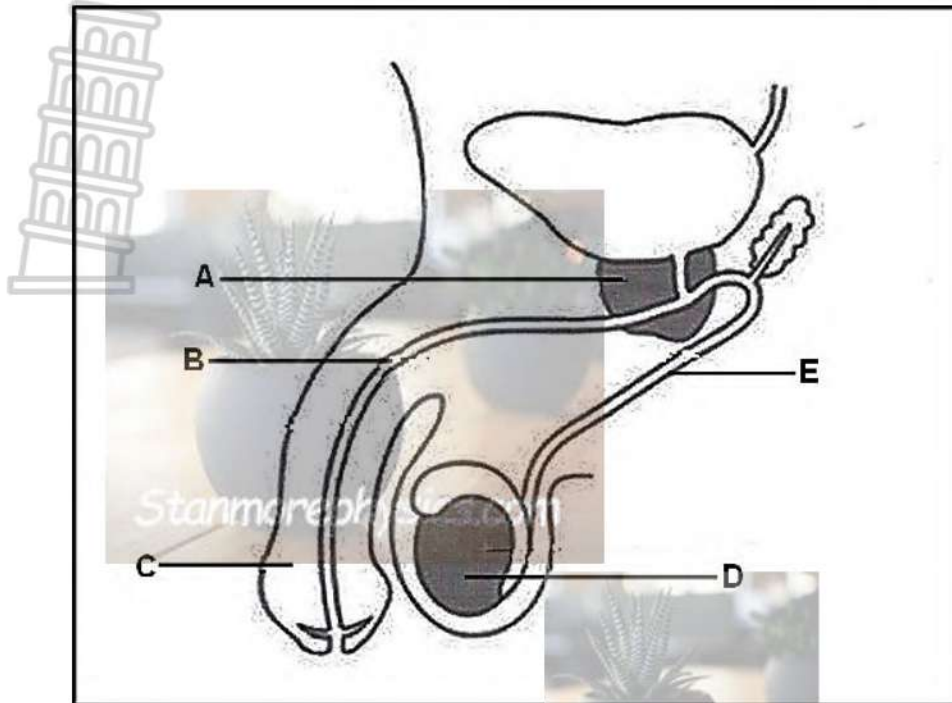
(2)

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

(1)

(7)

- 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)

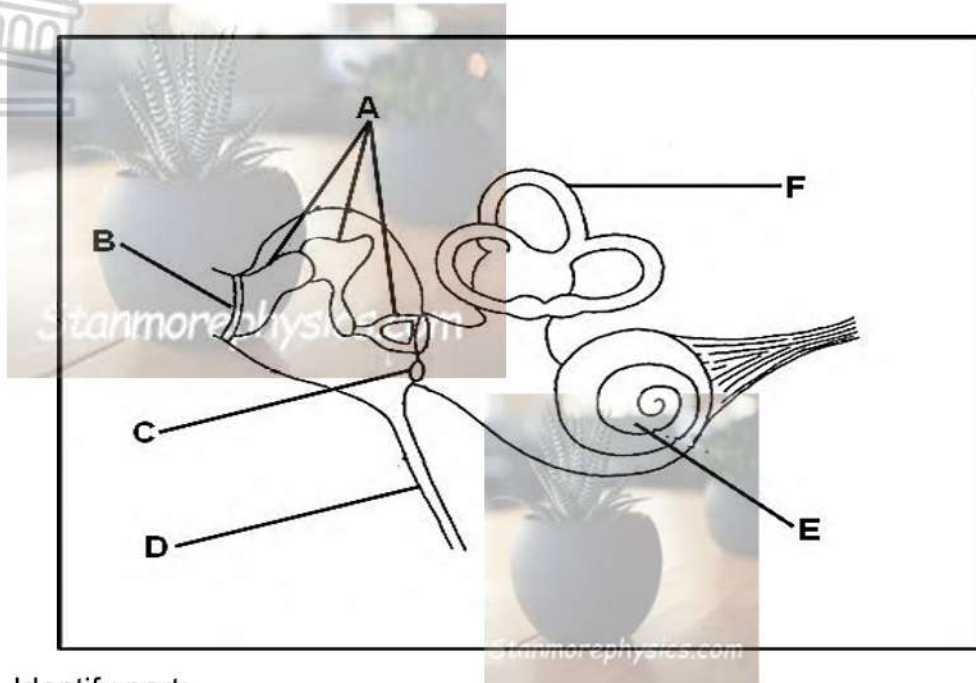
(7)

[50]

TOTAL SECTION A: 50

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.

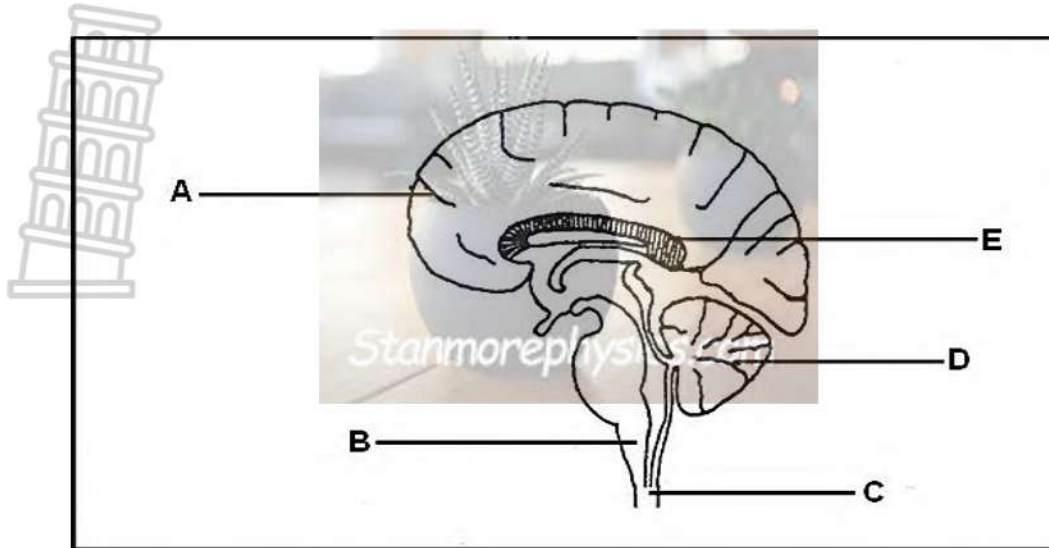
(3)

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

(5)

(16)

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)

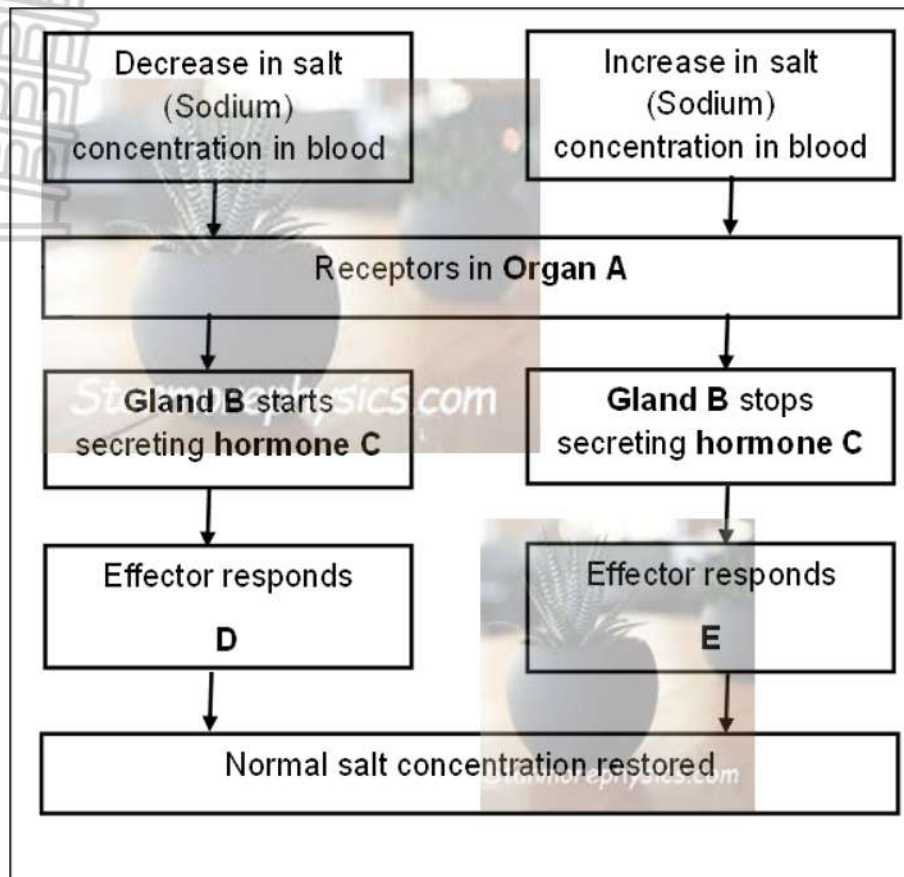
2.3 Describe the structure and the functioning of the autonomic nervous system.

(5)

(10)

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)

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.

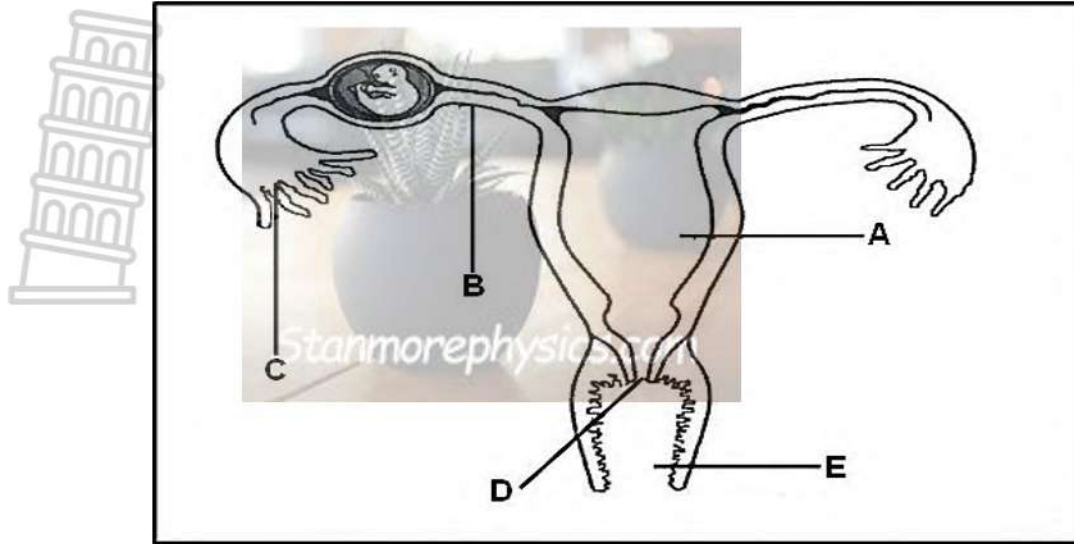
Ectopic pregnancies are caused by one or more of the following:

- 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:

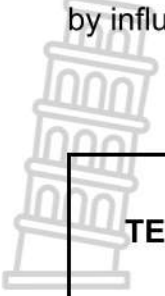
- Vaginal bleeding: lighter, heavier or darker than normal.
- Abdominal/Pelvic pain

In most cases the Fallopian tube has to be removed surgically to save the woman's life.



- 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)**

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



BODY TEMPERATURE (°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

- 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 °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.

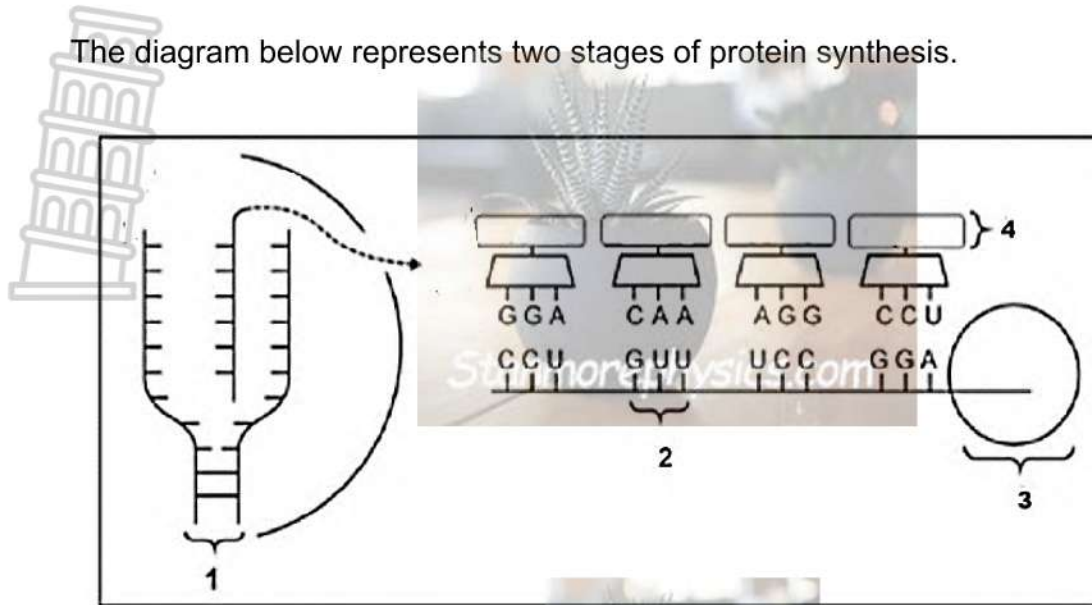
- 2.7.1 Where will you look for the evidence to detect the levels of TSH and thyroxin in the human body? (1)
- 2.7.2 A high level of TSH is detected in the human body.
Explain TWO possible causes of high levels of TSH in the body. (4)

(9)

[50]

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.

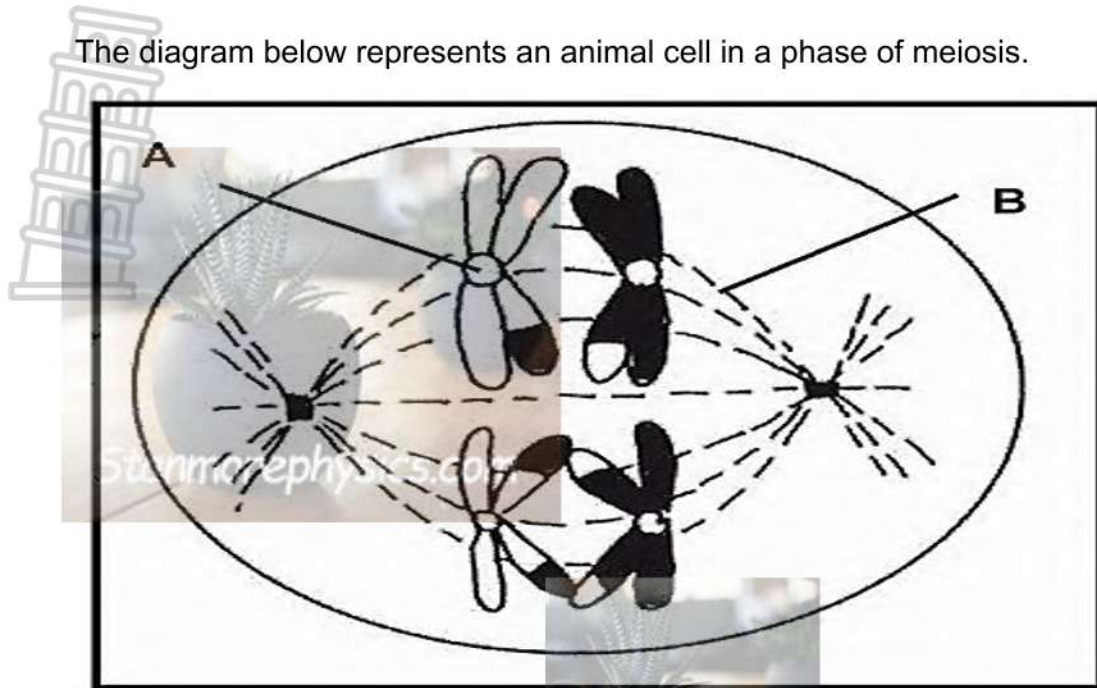
(6)

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

(2)

(12)

- 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)**

- 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

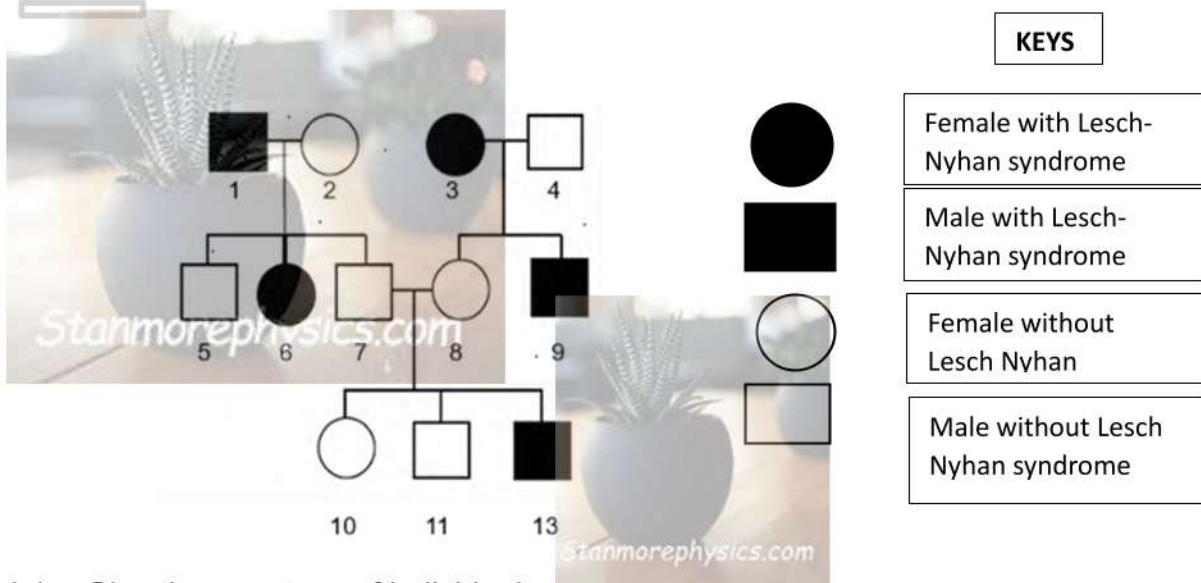
Height interval(cm)	Number of sunflower plants	
	Regie	Marieth
51-55	25	15
56-60	45	20
61-65	40	30
66-70	55	25
71-75	35	10

- 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)

- 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?

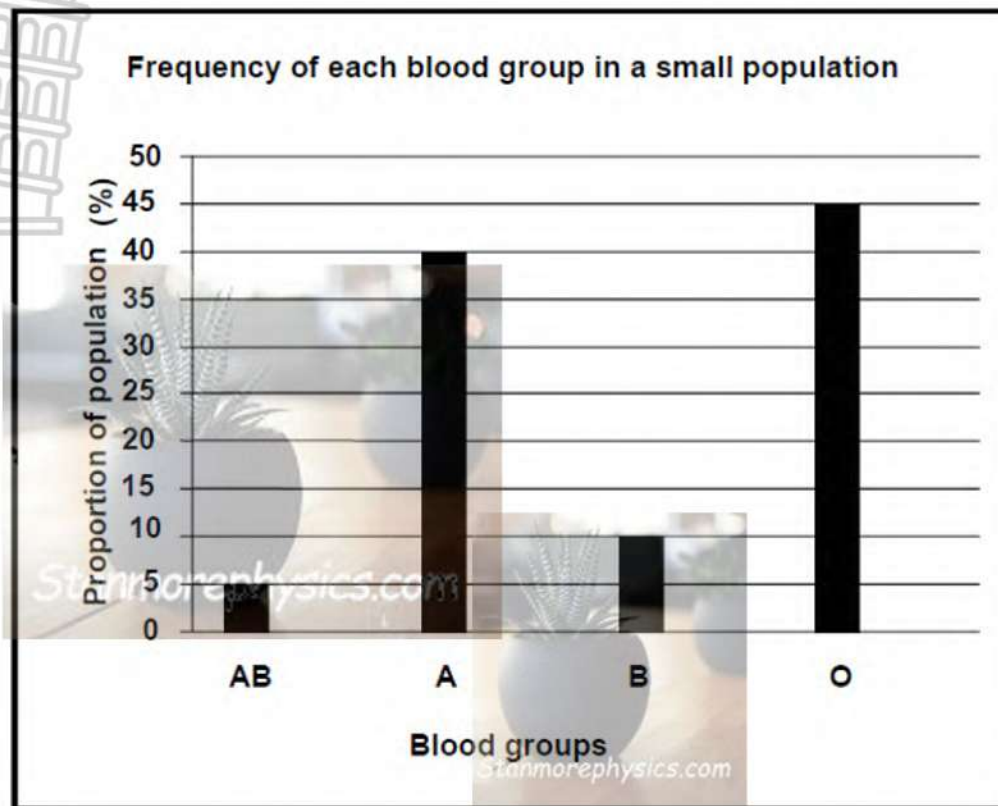
(1)

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

(3)

(8)

- 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

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.





LIMPOPO

PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
EDUCATION

GRADE 12

LIFE SCIENCES
JUNE EXAMINATION

2026

MARKING GUIDELINES

MARKS: 150

This MARKING GUIDELINES consists of 10 pages

PRINCIPLES RELATED TO MARKING LIFE SCIENCES

1. **If more information than marks allocated is given**
Stop marking when maximum marks is reached and put a wavy line and 'max' in the right hand margin.
2. **If, for example, three reasons are required and five are given**
Mark the first three irrespective of whether all or some are correct/incorrect.
3. **If whole process is given when only part of it is required**
Read all and credit relevant part.
4. **If comparisons are asked for and descriptions are given**
Accept if differences/similarities are clear.
5. **If tabulation is required but paragraphs are given**
Candidates will lose marks for not tabulating.
6. **If diagrams are given with annotations when descriptions are required**
Candidates will lose marks.
7. **If flow charts are given instead of descriptions**
Candidates will lose marks.
8. **If sequence is muddled and links do not make sense**
Where sequence and links are correct, credit. Where sequence and links are incorrect, do not credit. If sequence and links becomes correct again, resume credit.
9. **Non-recognized abbreviations**
Accept if first defined in answer. If not defined, do not credit the unrecognised abbreviation but credit the rest of answer if correct.
10. **Wrong numbering**
If answer fits into the correct sequence of questions but the wrong number is given, it is acceptable.
11. **If language used changes the intended meaning**
Do not accept.
12. **Spelling errors**
If recognizable, accept, provided it does not mean something else in Life Sciences or if it is out of context.
13. **If common names given in terminology**
Accept, provided it was accepted at the National memo discussion meeting.
14. **If only letter is asked for and only name is given (and vice versa)**
No credit.

15. **If units are not given in measurements**
Memorandum will allocate marks for units separately, except where it is already given in the question.
16. Be sensitive to the **sense of an answer, which may be stated in a different way.**
17. **Caption**
Credit will be given for captions to all illustrations (diagrams, graphs, tables, etc.) except where it is already given in the question.
18. **Code-switching of official languages (terms and concepts)**
A single word or two that appears in any official language other than the learners' assessment language used to the greatest extent in his/her answers should be credited, if it is correct. A marker that is proficient in the relevant official language should be consulted. This is applicable to all official languages.



NSC

SECTION A

QUESTION 1

1.1			
1.1.1	A✓✓		
1.1.2	D✓✓		
1.1.3	A✓✓		
1.1.4	D✓✓		
1.1.5	B✓✓		
1.1.6	C✓✓		
1.1.7	B✓✓		
1.1.8	A✓✓		
1.1.9	D✓✓		
1.1.10	C✓✓		
		(10x2)	(10)
1.2			
1.2.1	Complete dominance✓		
1.2.2	Multiple sclerosis✓		
1.2.3	Independent assortment✓		
1.2.4	Umbilical vein✓		
1.2.5	Heterozygous✓		
1.2.6	Endometrium✓		
1.2.7	Haploid✓		
1.2.8	Glucagon✓		
1.2.9	Allantois✓		
1.2.10	Reflex action✓		
		(10 x1)	(10)
1.3			
1.3.1	A only ✓✓		
1.3.2	A only ✓✓		
1.3.2	B only ✓✓	(3 x 2)	(6)
1.4			
1.4.1	(a) Pupil✓		(1)
	(b) Choroid✓		(1)
1.4.2	(a) A✓ – Iris✓		(2)
	(b) D✓ - Yellow spot✓		(2)
1.4.3	C✓		(1)
			(7)

NSC

1.5			
1.5.1	(a) Prostate gland✓		(1)
	(b) Vas deferens✓/sperm duct		(1)
1.5.2	(a) B ✓ - Urethra✓		(2)
	(b) D✓ – testis✓		(2)
1.5.3	Spermatogenesis✓		(1)
			(7)
		TOTAL SECTION A:	(50)



NSC

SECTION B			
QUESTION 2			
2.1			
2.1.1	(a) Eustachian tube✓		(1)
	(b) Cochlea✓		(1)
2.1.2	Absorbs the pressure set up in the inner ear✓	Mark first ONE only	(1)
2.1.3	- As we go higher, atmospheric pressure decreases✓ - The pressure from the outside of the tympanic membrane decreases✓ - compared to pressure from inside it✓ - This causes discomfort or pain✓ - Swallowing or yawning allows air to escape from the middle ear through the Eustachian tube✓ equalising pressure on both sides of the tympanic membrane✓	Any	(5)
2.1.4	- Sound vibrations are transmitted from the large tympanic membrane✓ - to the smaller oval window✓ - through the ossicles✓ - which are arranged from larger to the smallest✓ - This concentrates the vibrations✓ amplifying them	Any	(3)
2.1.5	- A change in speed/direction of movement of the head✓ - stimulates the cristae✓ - The stimulus is converted into an impulse✓ - The impulse is sent to the cerebellum✓ - through the auditory nerve✓ - The cerebellum sends impulses to the skeletal muscles✓ to restore balance	Any	(5)
			(16)
2.2			
2.2.1	(a) Medulla oblongata✓		(1)
	(b) Spinal cord✓		(1)
2.2.2	Cerebrum✓		(1)
2.2.3	- Joins the left and right hemispheres of the cerebrum✓ - Allow communication between the two hemispheres✓		(2)
			(5)
2.3	- Every organ and gland is controlled by two sets of nerves✓/double innervation - that act antagonistically✓ - to control involuntary events✓ - Sympathetic*✓ nerves - stimulates a response✓/ example - Parasympathetic*✓ nerves - inhibits a response✓/example	TWO* compulsory marks + Any 3	(5)

NSC

2.4			
2.4.1	(a) Kidney✓		(1)
	(b) Adrenal gland✓		(1)
	(c) Aldosterone✓		(1)
2.4.2	- Walls of the renal tubules✓/distal convoluted tubule and collecting duct - become more permeable✓ - allowing for reabsorption of sodium ions✓		(3)
			(6)
2.5			
2.5.1	- B✓ - D✓	Mark first TWO only	(2)
2.5.2	- Vaginal bleeding✓ - Abdominal✓/Pelvic pain	Mark first TWO only	(2)
2.5.3	- Poor/no placental development✓ - Insufficient space✓ - Decreased blood supply✓ - Insufficient nutrients/oxygen✓	Mark first THREE only	(3)
2.5.4	- The scar tissue✓ - may partially block the Fallopian tube✓ - preventing the embryo from reaching the uterus✓ - resulting in implantation in the Fallopian tube✓	Any	(2)
			(9)
2.6			
2.6.1	Constricted✓		(1)
2.6.2	- Less blood flows to the skin✓ - less heat is lost✓ - less sweat is formed✓ and therefore less evaporation - and less cooling of the skin✓ - Body heat is conserved✓	Any	(3)
2.7			
2.7.1	Blood✓		(1)
2.7.2	- The pituitary gland/hypophysis is damaged✓/malfunctioning and secretes large amounts of TSH✓ - The thyroid gland secretes less thyroxine✓ and this will not have a negative feedback effect on the pituitary gland to secrete less TSH✓	(2 x 2)	(4)
			(9)
			[50]

QUESTION 3

3.1.			
3.1.1			
	(a) DNA✓/ Deoxyribonucleic Acid		(1)
	(b) Ribosome✓		(1)
3.1.2			
	(a) 4✓		(1)
	(b) 2✓		(1)
3.1.3.	Translation *✓		
	-Each tRNA carries a specific amino acid ✓		
	- When the anticodon on tRNA✓		
	- matches the codon on mRNA ✓		
	- then tRNA brings the required amino acid to the ribosome✓		
	- amino acids become attached to each other by the peptide bonds ✓		
	- to form the required protein ✓		
		1* compulsory + Any 5	(6)
3.1.4			
	DNA	RNA	
	Has deoxyribose sugar✓	Has ribose sugar✓	
	Has nitrogen base thymine ✓ (T)	Has nitrogen base uracil ✓ (U)	
	Mark first ONE only; NO MARK FOR THE TABLE		(2)
			(12)
3.2.			
3.2.1			
	(a) Holds sister chromatids together✓ / attachment point for spindle fibres		(1)
		Mark first ONE only	
	(b) Attach to chromosomes✓/ align chromosomes at the equator/ pulls chromosomes to the opposite poles		(1)
		Mark first ONE only	
3.2.2	Metaphase I ✓		(1)
3.2.3	Anaphase 1✓		(1)
3.2.4	crossing over ✓		(1)
3.2.5			
	(a) 4 ✓		(1)
	(b) 2 ✓		(1)
	(c) 4 ✓		(1)

NSC

3.2.6	DNA replication✓	(1)																
		(9)																
3.3																		
3.3.1	To increase the reliability of the investigation✓✓/ increases the chances of the sample being representative of the plant population.	(2)																
3.3.2	- Amount of light✓ - Soil type✓ - Any other environmental factor Mark first TWO only	(2)																
3.3.3	Regie included a larger number of sunflower plants✓ / 10 plants in the sample	(1)																
3.3.4	Number of sunflower plants at each height interval in Regie's investigation  <table><caption>Data for Histogram</caption><thead><tr><th>Height interval (cm)</th><th>Number of sunflower plants</th></tr></thead><tbody><tr><td>51-55</td><td>25</td></tr><tr><td>56-60</td><td>45</td></tr><tr><td>61-65</td><td>40</td></tr><tr><td>66-70</td><td>55</td></tr><tr><td>71-75</td><td>35</td></tr></tbody></table>	Height interval (cm)	Number of sunflower plants	51-55	25	56-60	45	61-65	40	66-70	55	71-75	35					
Height interval (cm)	Number of sunflower plants																	
51-55	25																	
56-60	45																	
61-65	40																	
66-70	55																	
71-75	35																	
	Rubric/criteria for marking the graph																	
	<table><thead><tr><th>Criteria</th><th>Mark allocation</th></tr></thead><tbody><tr><td>Correct type of graph: histogram drawn (T)</td><td>1</td></tr><tr><td>Caption of the graph with both variables (C)</td><td>1</td></tr><tr><td>Correct labels for X and Y-axis including unit for X-axis (L)</td><td>1</td></tr><tr><td>Correct scale for Y-axis with equal width of bars with no spaces for X-axis (S)</td><td>1</td></tr><tr><td>Plotting: (P)</td><td></td></tr><tr><td>1- 4 coordinates are plotted correctly</td><td>1</td></tr><tr><td>All 5 coordinates are plotted correctly</td><td>2</td></tr></tbody></table>	Criteria	Mark allocation	Correct type of graph: histogram drawn (T)	1	Caption of the graph with both variables (C)	1	Correct labels for X and Y-axis including unit for X-axis (L)	1	Correct scale for Y-axis with equal width of bars with no spaces for X-axis (S)	1	Plotting: (P)		1- 4 coordinates are plotted correctly	1	All 5 coordinates are plotted correctly	2	(6)
Criteria	Mark allocation																	
Correct type of graph: histogram drawn (T)	1																	
Caption of the graph with both variables (C)	1																	
Correct labels for X and Y-axis including unit for X-axis (L)	1																	
Correct scale for Y-axis with equal width of bars with no spaces for X-axis (S)	1																	
Plotting: (P)																		
1- 4 coordinates are plotted correctly	1																	
All 5 coordinates are plotted correctly	2																	
		(11)																

NSC

3.4.		
3.4.1		
	(a) X^aY ✓	(2)
	(b) X^AY ✓	(2)
3.4.2.	$(3/7 \times 100)$ ✓ = 42.86 ✓ / 42.9 / 43%	(2)
3.4.3	3	(1)
3.4.4	-Female living ✓ with Lesch-Nyhan syndrome carries two / only recessive alleles / ✓ X^aX^a - Sons / Males inherit one X chromosome ✓ from their mothers - Sons/ males need only one recessive allele to have Lesch-Nyhan syndrome ✓ and therefore must inherit X^a from their mother ✓ Any Three	(3)
		(10)

3.5.		
3.5.1.	AB ✓	(1)
3.5.2.	4 ✓ / Four	(1)
3.5.3.	I^B ✓	(1)
3.5.4.	People from blood groups AB and B ✓ possess the B allele and since people with blood group AB and B together are less frequent than A or O ✓, the B allele is the least frequent	(2)
3.5.5.	Many people that are of blood groups A and B ✓ might be heterozygous ✓ / I^Ai and I^Bi many offspring could end up with ii combination ✓ OR Since the proportion of the population with O type is the greatest ✓ the possibility of reproduction ✓ between individuals with O group is greater and many offspring could end up with O blood group ✓	(3)
		(8)
		[50]
	TOTAL SECTION B:	100
	GRAND TOTAL:	150