LIMPOPO

PROVINCIAL GOVERNMENT

REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF

EDUCATION

NATIONAL

SENIOR CERTIFICATE

GRADE 12

LIFE SCIENCES FORMAL TEST 1

20 MARCH 2025

MARKS: 60

TIME: 1 hour

This question paper consists of 9 pages including the cover page

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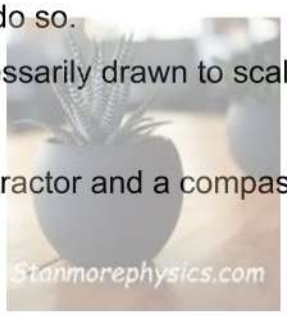
NSC

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 a 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 1.1.4) in the ANSWER BOOK, for example 1.1.6.D

1.1.1. During which phase of meiosis does the nuclear membrane disappear?

A Metaphase
B Telophase
C Prophase
D Anaphase

1.1.2. During copulation, the penis releases sperms directly into the

A Vagina
B Uterus
C Ovary
D Fallopian tubes

1.1.3. How many sex chromosomes does a normal female inherit from her mother?

A 1
B 2
C 23
D 46

1.1.4. A DNA template strand codes for the amino acid serine with ONE of the following base triplets

AGA AGG AGT TCA TCG AGC

The anticodon that codes fot the amino acid serine is ……

A AGT
B UGA
C TCG
D UCG

1.1.5. Which of the following is CORRECT regarding the events when fertilization did not occur?

	Corpus luteum	Progesterone level	Menstruation
A	Degenerates	Increases	Occur
B	Does not degenerate	Decreases	Does not occur
C	Degenerate	Decreases	Occur
D	Does not degenerate	Increases	Does not occur

(5x2) **(10)**

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 1.2.4) in your ANSWER BOOK.

1.2.1. A hormone that stimulates ovulation in humans

1.2.2. The variable that is controlled and does not change during the experiment

1.2.3. The period of the development of the foetus in the uterus

1.2.4. The natural shape of the DNA molecule

(4 x 1) **(4)**

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 young develops and is nourished in an amniotic egg that is retained in the mother's body.	A Ovipary B Vivipary
1.3.2.	Discovered the structure of the DNA molecule	A Francis Crick B James Watson
1.3.3.	A reproductive strategy in vertebrates where internal fertilization occurs	A Altricial development B Precocial development

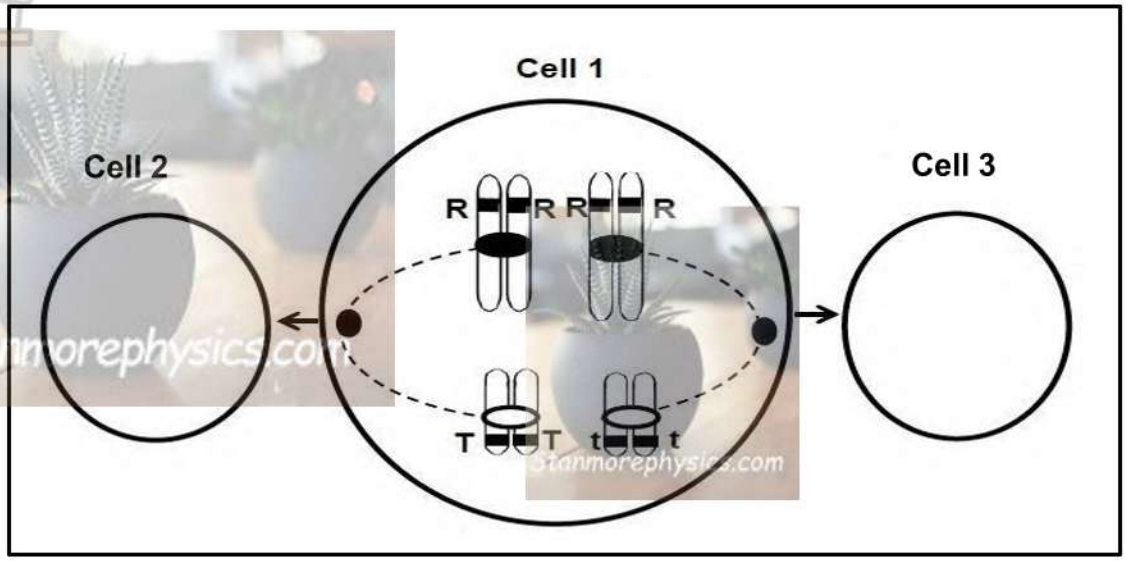
(3x2) **(6)**

TOTAL SECTION A: [20]

SECTION B

QUESTION 2

2.1. The diagram below represents a phase in meiosis. Cell 1 undergoes division to give rise to cell 2 and cell 3. Some alleles are indicated by letters.



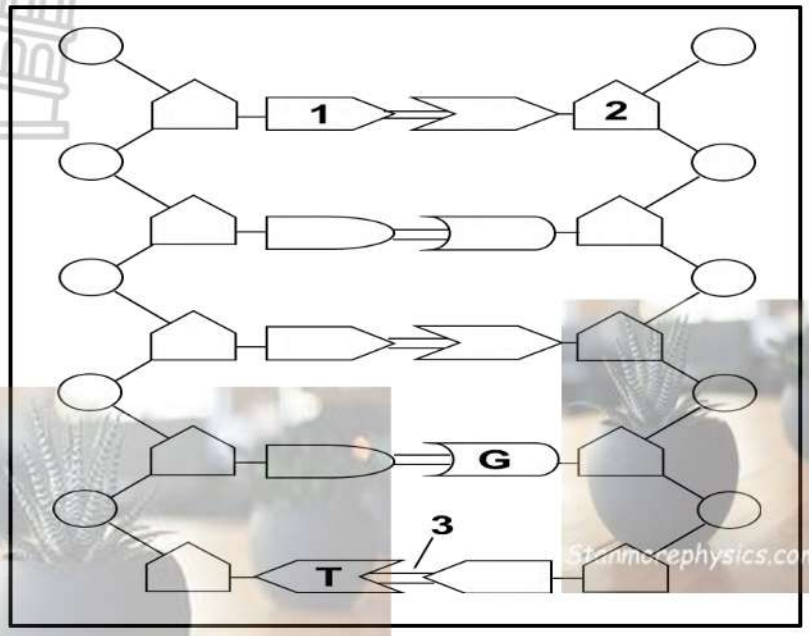
2.1.1 How many chromosomes would be present in the daughter cells produced by cell 3 after meiosis II. (1)

2.1.2. How does this Cell compare to the number of chromosomes found in a normal human somatic cell? (2)

2.1.3. Draw a labelled diagram of a gamete that will result from cell 1. (5)

(8)

2.2. The diagram shows part of a DNA molecule.



2.2.1 Give the number of nucleotides shown in the diagram. (1)

2.2.2. Name two places in an animal cell where this nucleic acid may be found. (2)

2.2.3. In 2000 bases found in this molecule, if 20% is adenine, what percentage of the bases will be cytosine? Show all your calculations. (3)

(6)

2.3. The first 7 triplets of nitrogenous bases that form part of the gene coding for one chain of the haemoglobin protein that makes up red blood corpuscles in humans is shown below. Study the table and answer the questions that follow.

DNA Template	CAC	GTG	GAC	TGA	GGA	CTC	CTC
Base triplet number	1	2	3	4	5	6	7

2.3.1 Write down the mRNA sequence for the triplets numbered 4 and 6 in the above table (2)

2.3.2. How many of the following are coded for in the DNA template sequence above?

(a) Nitrogenous bases (1)

(b) Number of different types of tRNA molecules that are required to form the polypeptide from this piece of DNA . (1)

2.3.3. Using the DNA template sequence in the first table and by using the table below, identify the amino acid sequence encoded by the base triplets at numbers 4 and 6.

Anticodons on tRNA	**Amino acid coded for**
CUC	Glutamate
GUC	Histidine
GGA	Proline
GAC	Leucine
UGA	Threonine
CAC	Valine

(2)

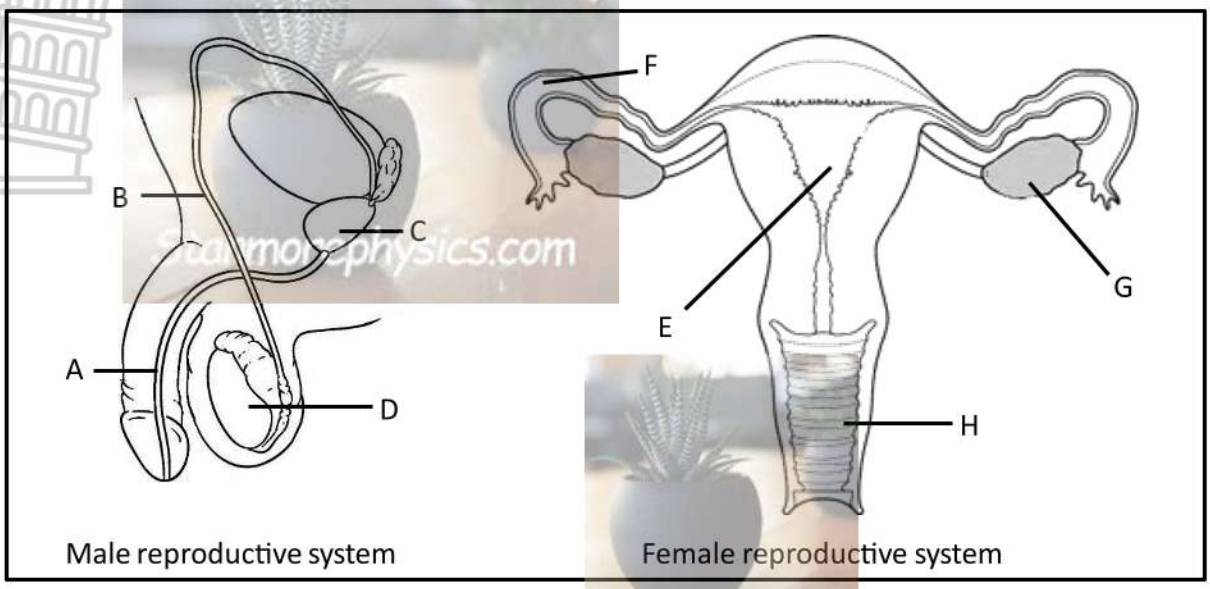
(6)

TOTAL QUESTION 2 : **[20]**

QUESTION 3

3.1.

Study the diagrams below showing the male and female reproductive systems



3.1.1 Identify the parts labelled D and F (2)

3.1.2. Explain the consequences for reproduction if part B is surgically cut. (2)

3.1.3. Describe how the secretion of the prostate gland provides protection to the sperm cell from the conditions of part H. (2)

(6)

3.2 Read the following extract and answer the questions that follow.

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Several recent studies have suggested a gradual decline in sperm production in men. Endocrine disruptions as well as lifestyle have been suggested as risk factors. One lifestyle factor that may affect human fertility is driving a vehicle for a prolonged period of time. It is suggested that the driving position may increase the scrotal temperature

3.2.1 State any one risk factor identified by the researchers. (1)

3.2.2 Explain why regular long-distance driving with no breaks could possibly lower the (3)

. sperm count in healthy males.

(4)

3.3. An investigation was carried out to determine the effects of smoking during pregnancy on the baby's birth weight. Babies born weighing 2 499 g or less have a low birth weight.

The table below compares the percentage of babies with a low birth weight born to mothers who smoked with mothers who did not smoke in a certain city in 2022.

Birth weight (grams)	Percentage of total births in 2022	
	Mothers who smoked	Non-smoking mothers
< 1000	0,7	0,2
1000 – 1499	0,9	0,3
1500 – 1999	2,2	1,1
2000 – 2499	7,1	3,2

3.3.1 Describe how chemicals from cigarette smoke can reach the baby's blood from the mother's blood. (2)

3.3.2. State a general conclusion for the investigation based on the data in the table. (2)

3.3.3. Draw a histogram to represent the percentage of births in each weight group born to mothers who smoked. (6)

(10)

TOTAL SECTION B: (40)

GRAND TOTAL: (60)