



KWAZULU-NATAL PROVINCE

EDUCATION
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

LIFE SCIENCES

COMMON ASSESSMENT TASK

MARCH 2025 TEST

MARKS: 50

TIME: 1 hour

This question paper consists of 9 pages.

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, 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 may use a non-programmable calculator, protractor and a compass.
11. Write neatly and legibly.

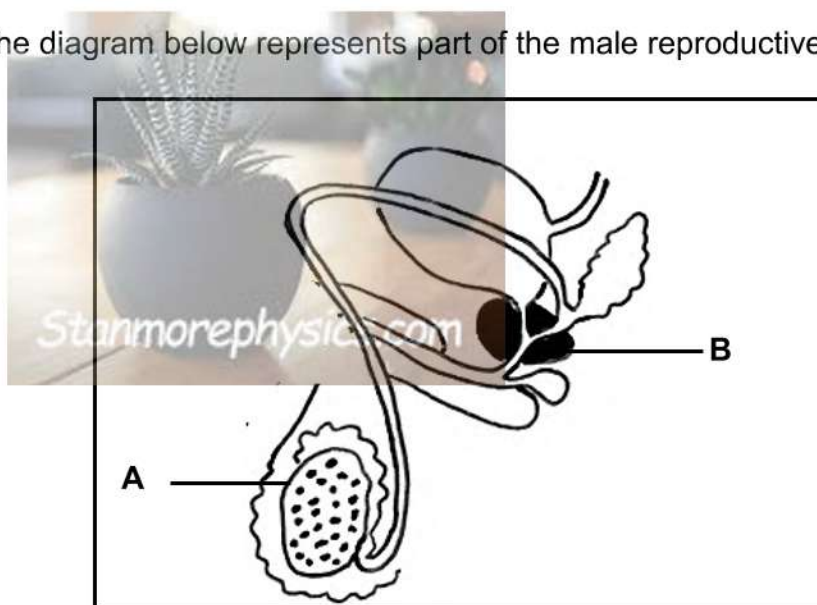
SECTION A**QUESTION 1**

- 1.1 Various options are provided as possible answers to the following questions. Choose the answer and write only the letter (A to D) next to the question number (1.1.1 to 1.1.4) in the ANSWER BOOK, for example 1.1.5 D.

1.1.1 Which ONE of the following in an amniotic egg provides nutrients for an embryo?

- A Allantois
- B Yolk sac
- C Chorion
- D Amnion

1.1.2 The diagram below represents part of the male reproductive system.



Which ONE of the following is CORRECT with regard to part **A** and **B** in the diagram above?

	A	B
A	It is a male gonad	Produces the male sex hormone
B	Produces oestrogen	Provides energy for the sperm cells
C	Stores sperm cells	It is a male sex organ
D	Produces testosterone	Produces alkaline fluid

- 1.1.3 A short piece of DNA molecule was analysed to determine the percentage of nitrogenous bases. 10% of the nitrogenous bases is cytosine.

What is the ratio of **adenine** to **guanine** in this DNA molecule?

- A 1:4
- B 10:40
- C 4:1
- D 40:10

- 1.1.4 Which ONE of the following occurs in meiosis but NOT in mitosis?

- A Spindle fibres attach to the centromere
- B Chromosomes arrange at the equator of the cell
- C Chromatids are pulled towards opposite poles
- D Sex cells are formed at the end of cell division

(4 x 2) (8)

- 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 1.2.3) in the ANSWER BOOK.

1.2.1 The hormone that stimulates the formation of the corpus luteum

1.2.2 The failure of the chromosome pairs to separate during meiosis

1.2.3 The division of the cytoplasm after the nuclear division

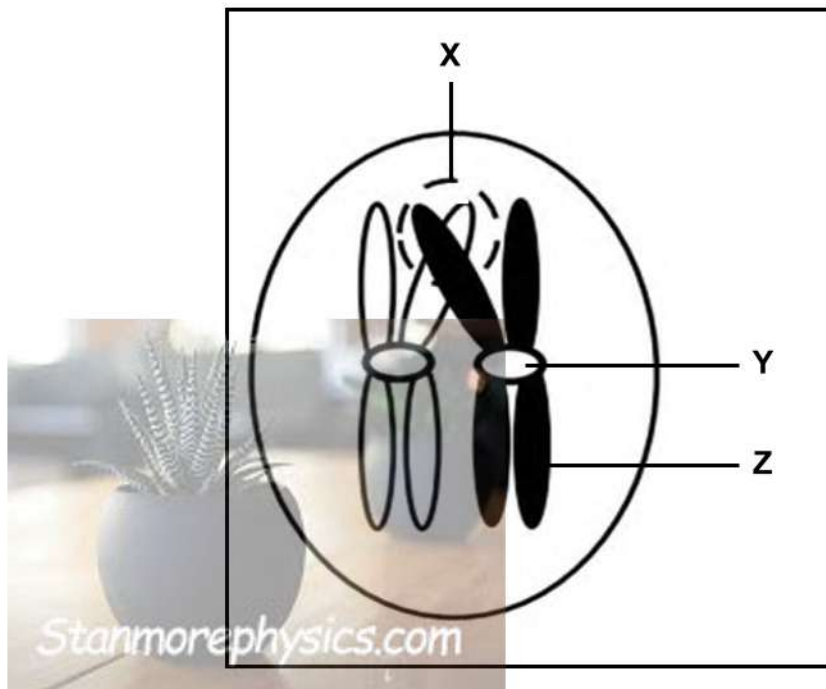
(3 x 1) (3)

- 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 1.3.2) in the ANSWER BOOK.

	COLUMN I	COLUMN II
1.3.1	Offspring are born with eyes closed and unable to move	A: Altricial B: Precocial
1.3.2	A process that produces four mature gametes in humans from a single diploid cell	A: Oogenesis B: Spermatogenesis

(2 x 2) (4)

1.4 The diagram below shows part of the phase of meiosis.



1.4.1 Identify part:

(a) **Y** (1)

(b) **Z** (1)

1.4.2 Name the:

(a) Process shown in the diagram at point **X** (1)

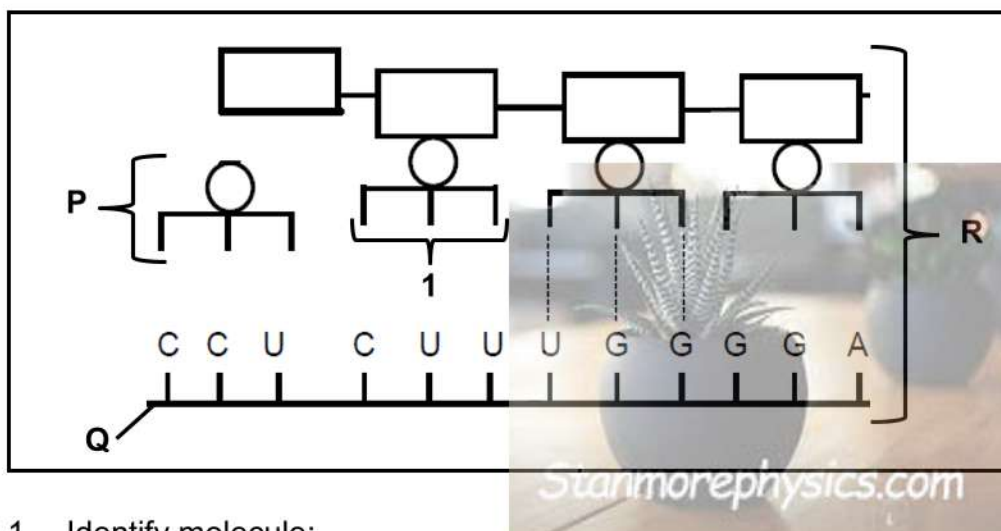
(b) Phase that follows the one shown in the diagram (1)

1.4.3 How many chromosomes will be formed at the end of meiosis in the cell above? (1)
(5)

TOTAL SECTION A: 20

SECTION B**QUESTION 2**

2.1 The diagram below shows part of protein synthesis.



2.1.1 Identify molecule:

(a) **P**

(1)

(b) **Q**

(1)

2.1.2 Name process **R**.

(1)

2.1.3 Write down the correct sequence of base triplet number 1.

(1)

2.1.4 Explain the role of molecule **P** in protein synthesis.

(3)

2.1.5 The table below shows the DNA base triplets and their corresponding amino acids.

AMINO ACID	DNA BASE TRIPLET
Tryptophan	GAA
Serine	GTA
Leucine	CCT
Tyrosine	GGA

The codon CCU (first codon) on molecule **Q** changed to CAU.

Explain the effect this would have on this particular protein molecule.

(3)

(10)

2.2 The diagram below shows the DNA profiles of Susan, her mother and three men.

There is uncertainty about who the biological father of Susan is. A DNA profiling was conducted to establish who the father is.

[illegible]

2.2.1 Identify the man that is most likely to be Susan's father amongst the three men.

2.2.2 Explain your answer in QUESTION 2.2.1. (2)

2.2.3 State ONE reason why the evidence from DNA profiling may be considered reliable. (1)

2.2.4 Give ONE other use of DNA profiling. (1)
(5)
[15]

QUESTION 3

- 3.1 Scientists conducted an investigation to determine the effect of zinc supplements on the level of testosterone in the blood of males who participate in weightlifting.

The procedure was as following:

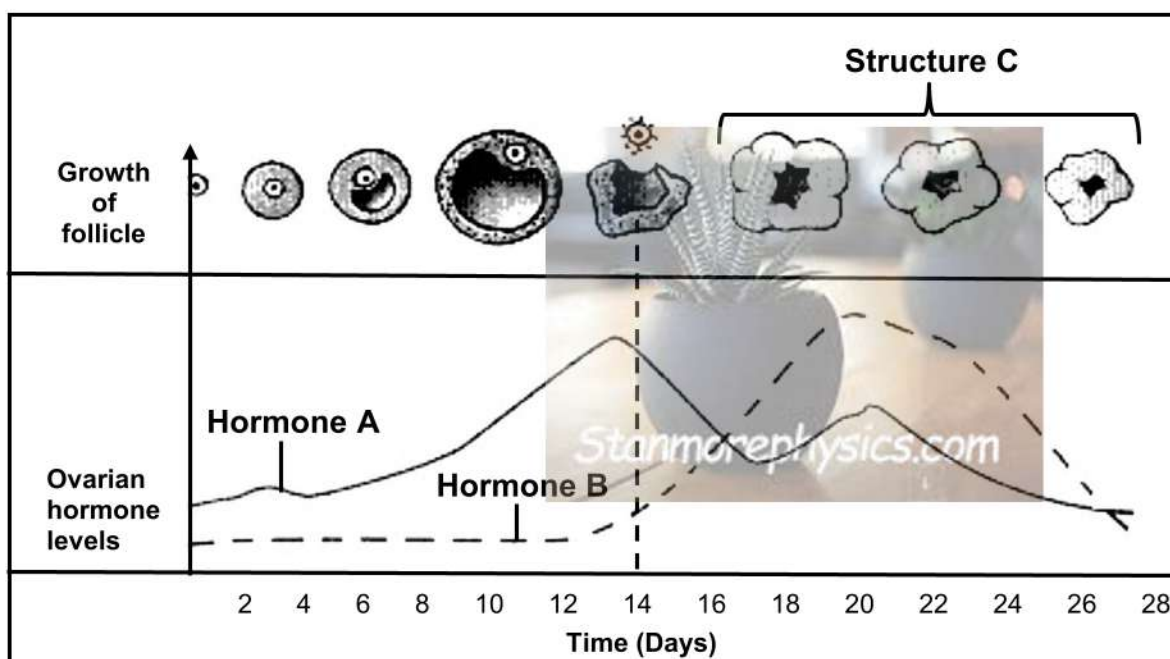
- 100 healthy males of the same age were selected to participate in the investigation.
- Males were divided into two equal groups (**A** and **B**).
- They were given the same diet for the duration of the investigation.
- Before the start of the investigation, the average testosterone level of group **A** was 348.4 and **B** was 346.6.
- Group **A** was given a zinc supplement at the start the investigation.
- Group **B** was not given a zinc supplement.
- Their testosterone level in the blood was measured before and after the investigation.
- The average testosterone level in their blood was calculated.

The results are shown in the table below.

GROUP	AVERAGE TESTOSTERONE LEVEL IN BLOOD (ng/dL)
A	639.4
B	345.3

- 3.1.1 Identify the independent variable in the investigation. (1)
- 3.1.2 State ONE way in which the scientists ensured the reliability of the results. (1)
- 3.1.3 Name ONE factor that should have been considered about the zinc supplements to ensure the validity of the investigation. (1)
- 3.1.4 Group **B** was the control.
- Explain the importance of group **B** in the investigation. (2)
- 3.1.5 Calculate the difference between the average testosterone level of group **A** in the blood before and after zinc supplement was given. (2)
- (7)

- 3.2 The diagram below shows the growth of the follicle and levels of ovarian hormones (**A** and **B**) during the menstrual cycle.



3.2.1 Identify hormone:

- (a) **A** (1)
- (b) **B** (1)

3.2.2 On which day did ovulation take place? (1)

3.2.3 Describe the relationship between structure **C** and hormone **B** from day 20 to day 26. (2)

3.2.4 Explain the consequence if the Graafian follicle fail to secrete hormone **A**. (2)

3.2.5 State ONE effect of low levels of hormone **B** in the blood during menstrual cycle. (1)

(8)

TOTAL SECTION B: 30

GRAND TOTAL: 50

FINAL



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GRADE 12



MARKS: 50

This marking guideline consists of 6 pages

PRINCIPLES RELATED TO MARKING LIFE SCIENCES MARCH 2025

1. **If more information than marks allocated is given**
Stop marking when maximum marks are 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 is incorrect, do not credit. If sequence and links becomes correct again, resume credit.
9. **Non-recognised abbreviations**
Accept if first defined in answer. If not defined, do not credit the unrecognized 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**
Candidates will lose marks. Memorandum will allocate marks for units separately
16. Be sensitive to the **sense of an answer, which may be stated in a different way.**
17. **Caption**
All illustrations (diagrams, graphs, tables, etc.) must have a caption
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.

SECTION A**QUESTION 1**

1.1	1.1.1	B✓✓		
	1.1.2	D✓✓		
	1.1.3	C✓✓		
	1.1.4	D✓✓		
			(4 x 2)	(8)
1.2	1.2.1	Luteinising hormone✓ / LH		
	1.2.2	Non-disjunction✓		
	1.2.3	Cytokinesis✓		
			(3 x 1)	(3)
1.3	1.3.1	A only✓✓		
	1.3.2	B only✓✓		
			(2 x 2)	(4)
	1.4.1	(a) Centromere✓		(1)
		(b) Chromatid✓		(1)
	1.4.2	(a) Crossing over✓		(1)
		(b) Metaphase 1✓		(1)
	1.4.3	1✓		(1)
				(5)
TOTAL SECTION A:				20

SECTION B**QUESTION 2**

2.1	2.1.1	(a) tRNA✓		(1)
		(b) mRNA✓		(1)
	2.1.2	Translation✓		(1)
	2.1.3	GAA✓		(1)
	2.1.4	- Brings specific amino acids✓		
		- to the ribosome✓		
		- For the formation of the required protein✓		(3)

- 2.1.5 - Different protein will be formed✓
 - since anticodon GGA✓/ DNA triplet GGA
 - changed to GUA✓/ DNA triplet GTA
 - and amino acid tyrosine✓
 - will be replaced by serine✓ in a protein

OR

- Different / same protein will be formed✓
 - Since anticodon GGA will change✓
 - to anticodon GUA✓
 - Bringing different / same amino acid✓

Any (3)
(10)

2.2 2.2.1 Man 2✓

(1)

- 2.2.2 - Some(three) black bars of Susan's DNA profile correspond with that of the mother✓
 - The remaining (two) black bars of Susan's DNA profile correspond with that of Man 2✓

(2)

2.2.3 DNA of each individual is unique, except in the case of identical twins✓
(Mark the first ONE only)

(1)

- 2.2.4 - To identify criminals✓/ resolve disputes
 - To identify organisms from their remains✓/dead bodies
 - To identify family relationships other than paternity✓ e.g. siblings
 - To diagnose genetic disorders✓
 - To establish matching tissues✓/for tissue typing

Any (1)
(5)

QUESTION 3

3.1 3.1.1 Zinc supplement✓

(1)

3.1.2 50 (healthy) males in each group ✓participated in the investigation
(Mark the first ONE only)

(1)

- 3.1.3 - Type of zinc supplement✓
 - Concentration of zinc✓/ Volume of zinc
(Mark the first ONE only)

Any (1)

- 3.1.4 - Group B did not receive the zinc supplement✓
 - If testosterone level increases in group A, it will be due to zinc supplement✓

(2)

3.1.5 $639.4 - 348.4$ ✓
 $= 291$ ✓

(2)
(7)

- | | | | |
|-----|-------|---|-------------------|
| 3.2 | 3.2.1 | (a) Oestrogen✓ | (1) |
| | | (b) Progesterone✓ | (1) |
| | 3.2.2 | 14✓ | (1) |
| | 3.2.3 | As the structure C / corpus luteum degenerates✓ the level of hormone B /progesterone decreases✓ | (2) |
| | 3.2.4 | - There will be no thickening of the endometrium✓
- for the implantation / attachment of embryo✓ | (2) |
| | 3.2.5 | No inhibition of pituitary gland from producing FSH✓
(Mark the first ONE only) | (1)
(8) |

TOTAL SECTION B: 30

GRAND TOTAL: 50

GRADE 12 Alternatives

Q2.1.5

- The codon CCU code for same amino acid/tyrosine as DNA triplet GGA✓
- The codon CCU changed to codon CAU which code for same amino acid/serine as the DNA triplet GTA✓
- Therefore, the amino acid serine will replace tyrosine✓
- Resulting with the different protein formed✓

Q2.2.3

- DNA cannot be altered✓

Q2.2.4

- Tracing of ancestry✓

Q3.1.2

- 100 men divided into two equal groups✓

Q3.1.4

- To verify that zinc supplement is the only cause of increasing the level of testosterone in group A✓

Q3.2.4

- May results in no stimulation of pituitary gland to release more LH✓
- resulting ovulation not taking place✓

Q3.2.5

- It will result in the endometrium breaking down✓/there will be no further development of the endometrium/endometrium will no longer be maintained.

OR

- FSH level will increase✓
- stopping further thickening of endometrium✓
- Implantation will not take place✓