**KWAZULU-NATAL PROVINCE**

**EDUCATION**
REPUBLIC OF SOUTH AFRICA

# NATIONAL SENIOR CERTIFICATE

## GRADE 12



## LIFE SCIENCES

## COMMON ASSESSMENT TASK

## MARCH 2025 TEST

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**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.

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## SECTION A

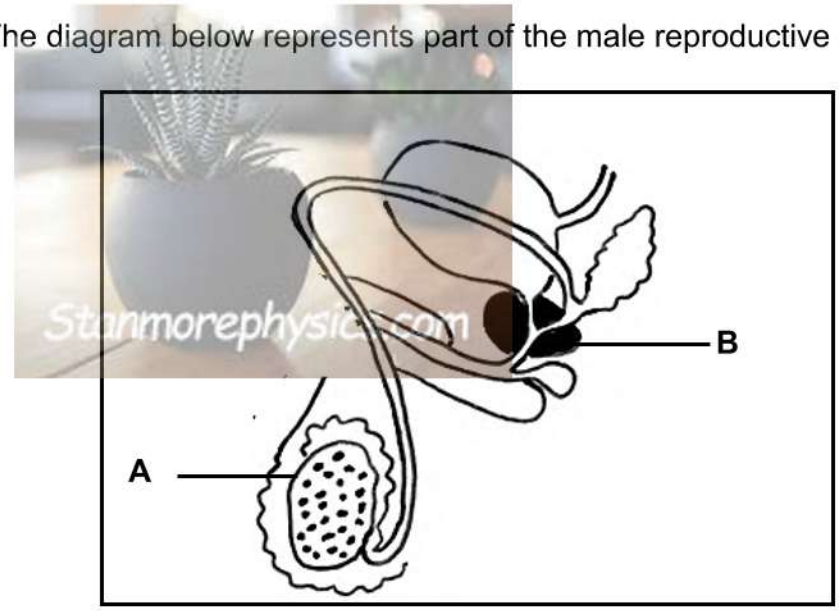
## QUESTION 1

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

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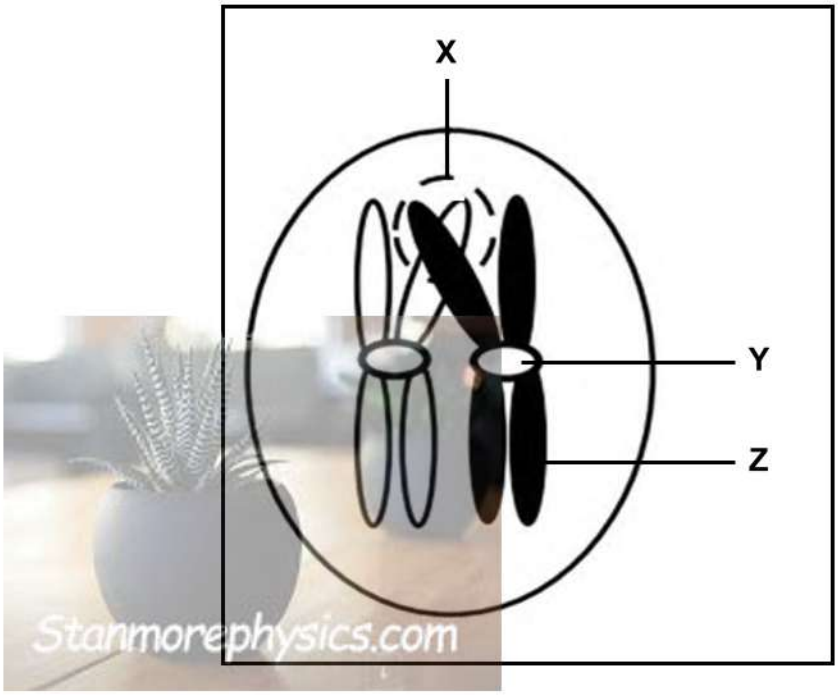
(3 x 1) **(3)**

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<br>B: Precocial |
| 1.3.2 | A process that produces four mature gametes in humans from a single diploid cell | A: Oogenesis<br>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)

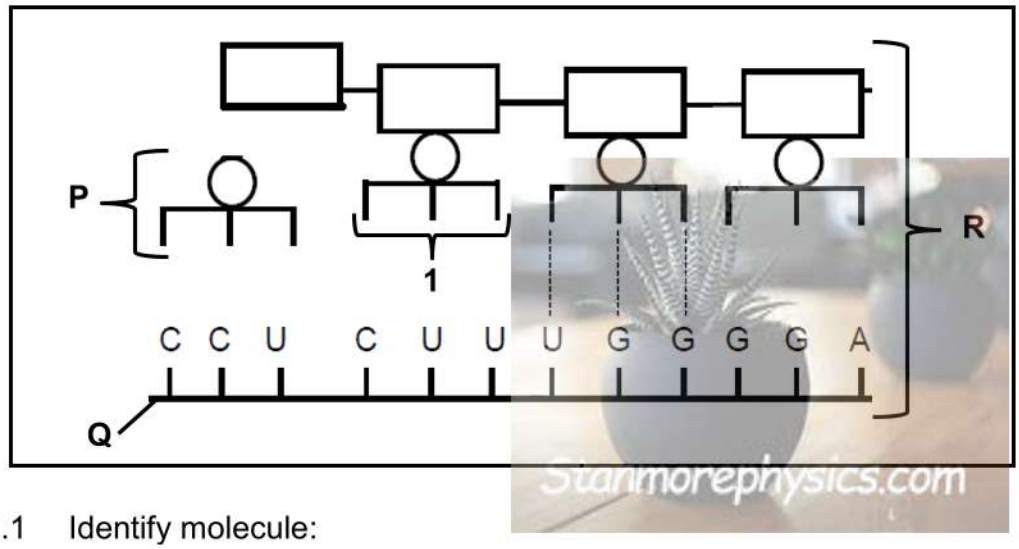
1.4.3 How many chromosomes will be formed at the end of meiosis in the cell above? (1)
**(5)**

**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.

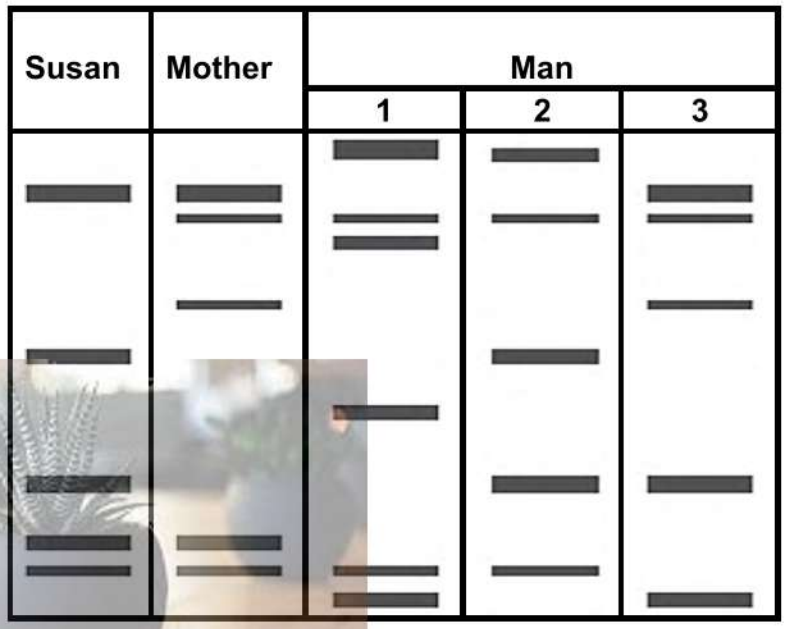
| AMINO ACID | DNA BASE TRIPLET |
|---|---|
| Tryptophan | GAA |
| Serine | GTA |
| Leucine | CCT |
| Tyrosine | GGA |

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.




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2.2.1 Identify the man that is most likely to be Susan's father amongst the three men. (1)

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 |

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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)

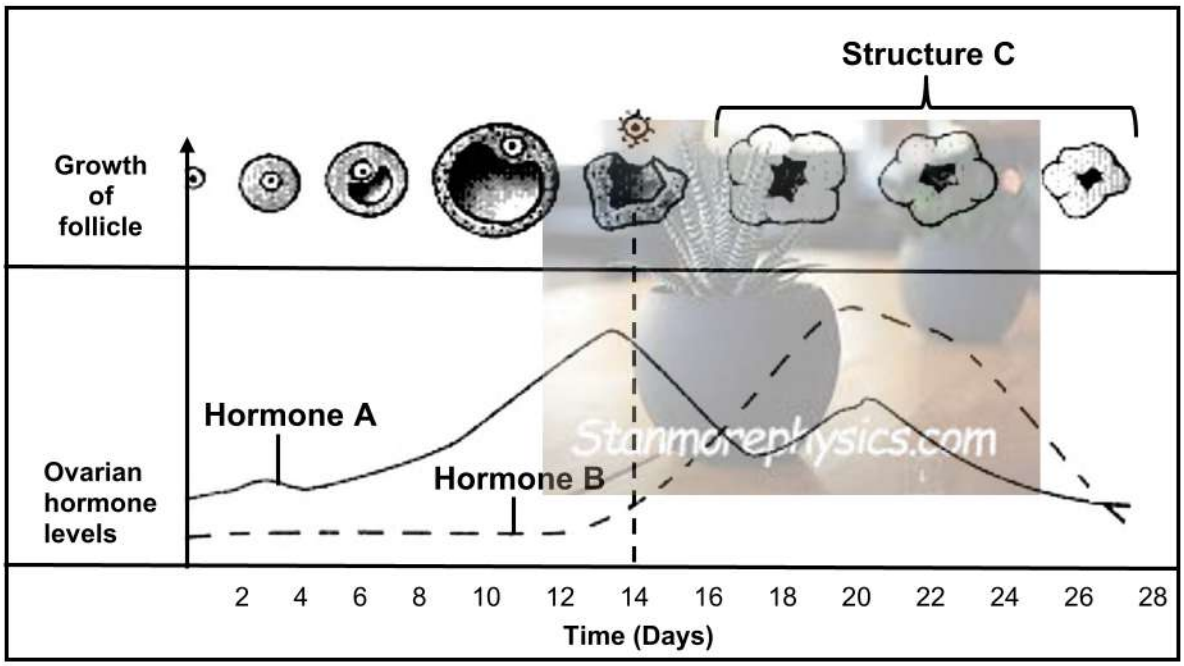
3.1.3 Name ONE factor that should have been considered about the zinc supplements to ensure the validity of the investigation. (1)

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**

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