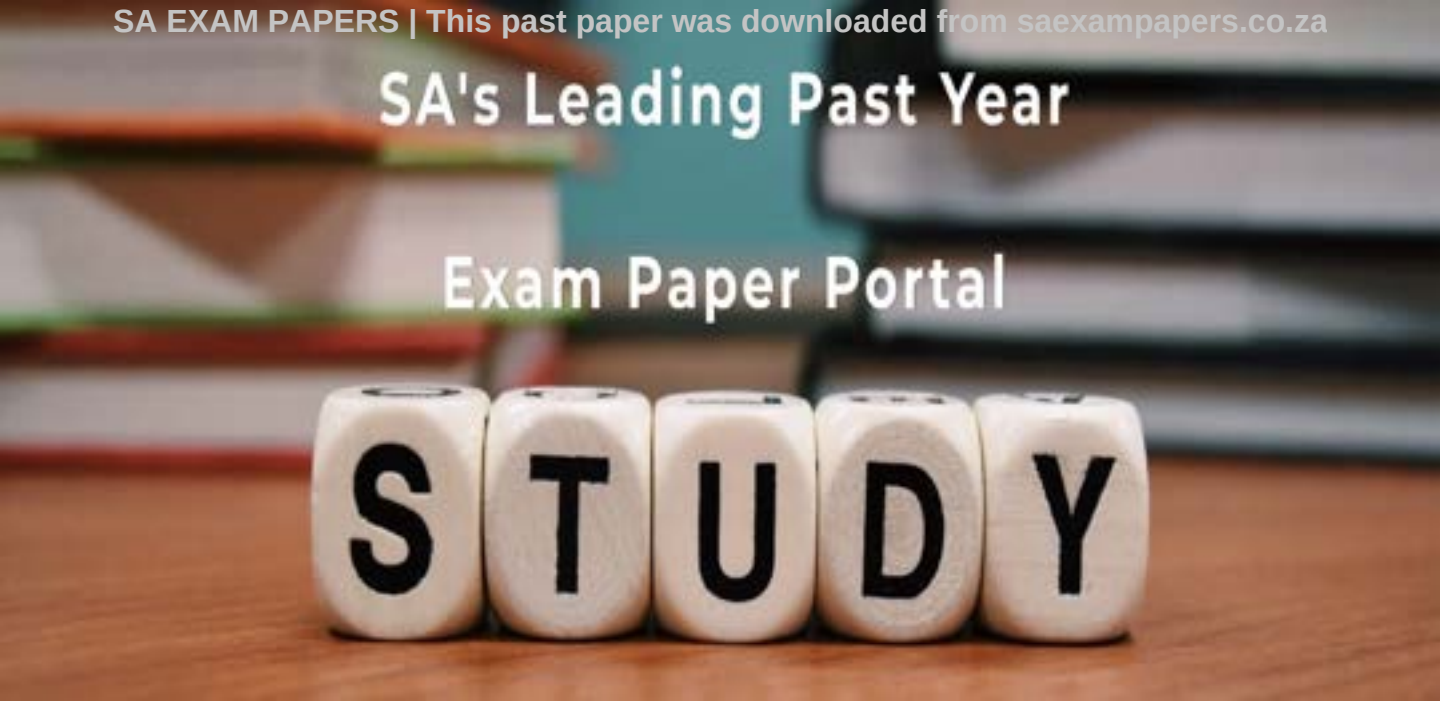


Province of the
EASTERN CAPE
EDUCATION

Iphondo leMpuma Kapa: Isebe leMfundo
Provinsie van die Oos Kaap: Department van Onderwys
Porafensie Ya Kapa Botjahabela: Lefapha la Thuto

NATIONAL SENIOR CERTIFICATE

GRADE 12

MARCH 2024

LIFE SCIENCES CONTROLLED TEST 1

MARKS: **50**

TIME: **60 minutes**

This question paper consists of 8 pages.

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 answer 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 where necessary.
11. Write neatly and legibly.

12 Round off all calculations to two decimals after the comma.

SECTION A

QUESTION 1

1.1 Various options are given 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 1.1.2) in the ANSWER BOOK, for example 1.1.3 D.

1.1.1 The part of the female reproductive system where fertilization takes place is …

A cervix
B ovary
C vagina
D fallopian tube

1.1.2 Which ONE of the following events occurs during metaphase I of meiosis?

A Chromosomes arrange themselves singly at the equator.
B Chromosomes arrange themselves in pairs at the equator.
C Centrioles move to opposite poles.
D Splitting of the cytoplasm. (2 x 2) **(4)**

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 A hollow ball of cells formed from the zygote.

1.2.2 The structure that provides nutrients to the developing embryo in oviparous animals

1.2.3 Organelle outside the nucleus of animal cells that contains DNA.

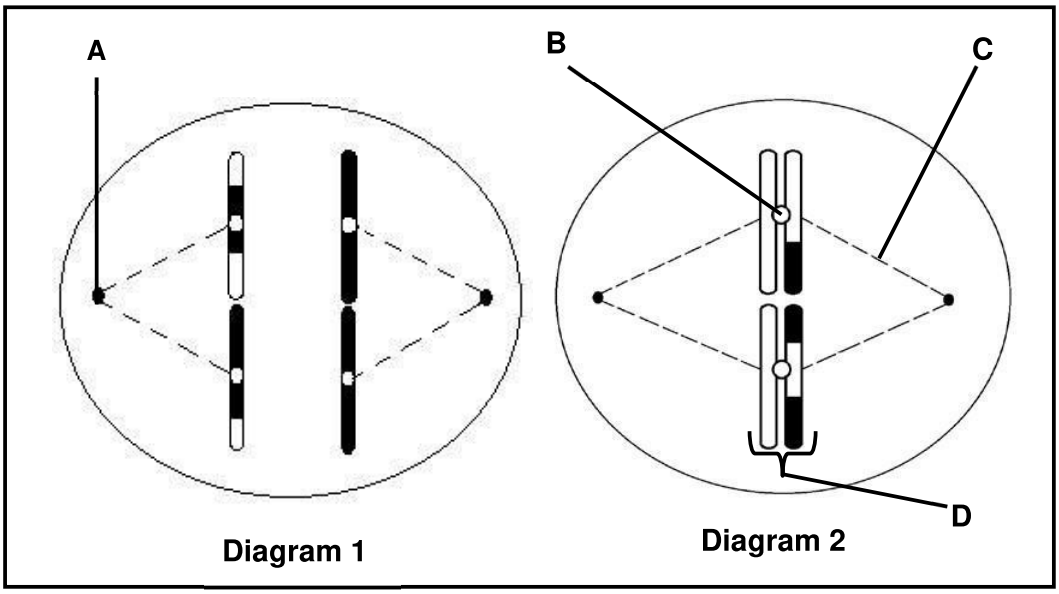
(3 x 1) **(3)**

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	Produced the first X- ray image of the DNA molecule	A: Watson and Crick B: Rosalind Franklin
1.3.2	Organisms that give birth to live young ones	A: Viviparous B: Ovoviviparous

(2 x 2) **(4)**

1.4 The diagrams below represent two phases of meiosis in an organism.



1.4.1 Identify the phase of meiosis represented in Diagram **1**. (1)

1.4.2 Provide labels for:

(a) **A** (1)

(b) **B** (1)

(c) **C** (1)
(4)

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 Describe the process of transcription. (5)

2.2 The table below shows some codons of mRNA together with their corresponding amino acids.….

mRNA CODON	AMINO ACID
UUU	Phenylalanine
CUC	Leucine
AUG	Methionine
UAU	Tyrosine
CGU	Arginine
GAU	Aspartic acid
GUU	Valine
GAA	Glutamic acid
AGU	Serine
ACC	Threonine
ACA	Serine
GAC	Aspartic acid

The base sequence of a section of mRNA formed during transcription from a portion of DNA, is shown below.

AUG GUU GAA GAU GUU GAC

2.2.1 If the mRNA is read from left to right:

(a) What will be the anticodon of the tRNA, that will bring in the first amino acid required? (1)

(b) What will the second amino acid required during translation be? (1)

(c) Give the triplet bases of DNA that code for threonine (1)

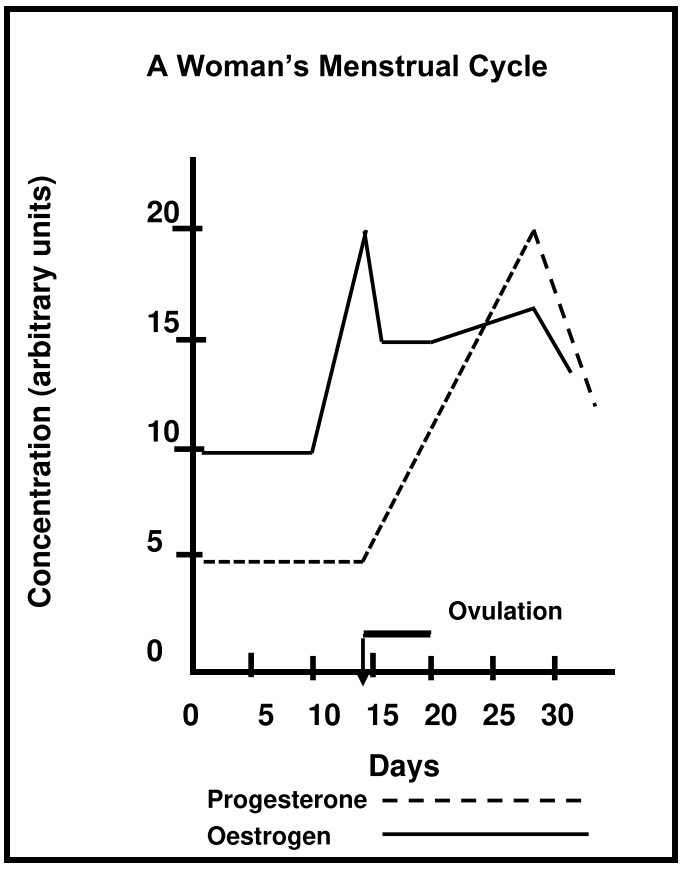
2.2.2 A mutation took place in the DNA molecule. The mutated DNA resulted in a section of mRNA molecule with the following base sequence instead, as shown below:

AUG GUU GAA GAC GUU GAC

Explain why this mutation would have no effect on the protein that will be synthesized from this mRNA molecule. (2)

(10)

2.3 Study the graph that shows the relative concentration of two hormones affecting the menstrual cycle in most women.



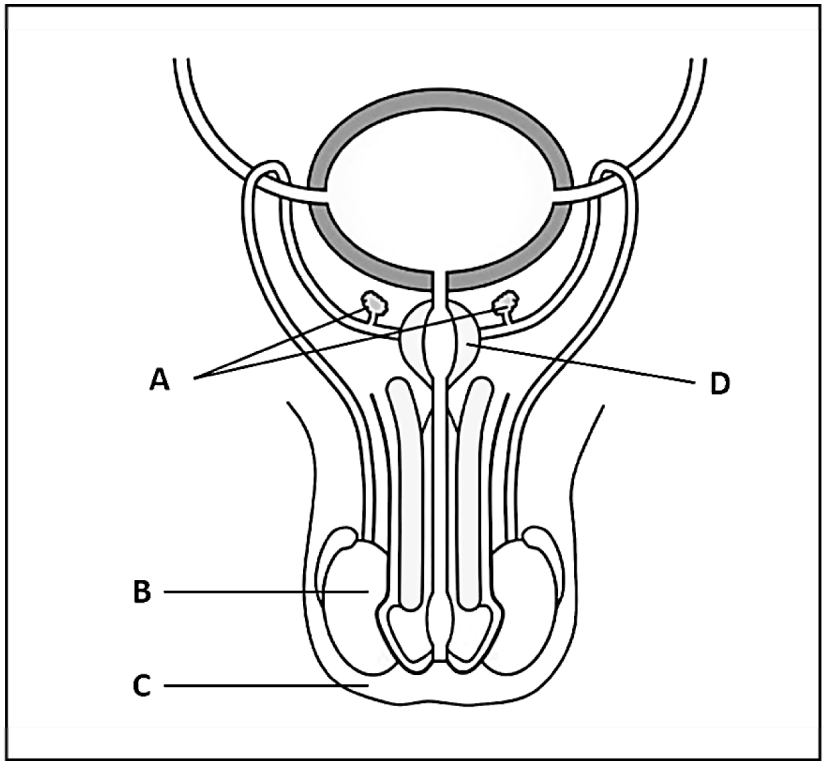
2.3.1 Which hormone's concentration peaks during ovulation? (1)

2.3.2 Describe the effect that a high concentration of the hormone mentioned in QUESTION 2.3.1 has in the female body. (2)

2.3.3 Describe the changes that occur in the ovary during the 30 day cycle (4)
(7)
[17]

QUESTION 3

3.1 The diagram below shows the male reproductive system.



3.1.1 Identify:

(a) **A** (1)

(b) **C** (1)

3.1.2 Explain ONE function of part **D.** (2)

3.1.3 Explain ONE consequence for reproduction if **B** was at the same temperature as the rest of the body. (2)

3.1.4 Explain TWO structural adaptations of the sperm to ensure that fertilization is successful. (4)
(10)

3.2 Describe the process spermatogenesis **(3)**

3.3 An investigation was conducted to determine the relationship between the age of mothers and the risk of having a child with Down Syndrome.

The results of the investigation are shown in the table below.

Age of mother	**Risk of having a child with Down Syndrome**
20	1 in 1500
25	1 in 1300
30	1 in 900
35	1 in 350
40	1 in 100

3.3.1 Identify the independent variable (1)

3.3.2 Describe the relationship between the age of the mother and the risk of having a child with Down syndrome (2)

3.3.3 How many times greater is the risk of having a child with Down syndrome when the mother is 40, compared to when she is 30 years old? (2)
(5)
[18]

TOTAL SECTION B: 35
GRAND TOTAL: 50