KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

LIFE SCIENCES

COMMON TEST

MARCH 2023

MARKS: 50

TIME: 1 hour

This question paper consists of 10 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

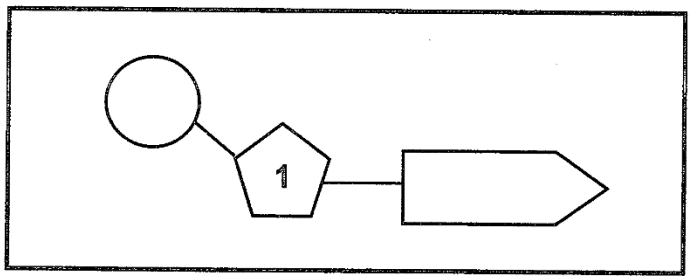
QUESTION 1

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 1.1.3) in the ANSWER BOOK, for example 1.1.4 D.

1.1.1 Which ONE of the following in a male reproductive system stores sperms temporarily?

A Vas deferens
B Seminal vesicle
C Urethra
D Epididymis

1.1.2 The diagram below shows the nucleotide of a tRNA molecule.



The correct label for part 1 is ...

A deoxyribose sugar.
B ribose sugar.
C phosphate.
D adenine.

1.1.3 Which ONE of the following is correct with regard to the biological importance of meiosis?

A Reduces chromosome number by half and ensures genetic variation in gametes
B Produces diploid gametes and ensures genetic variation
C Produces haploid gametes that are genetically identical
D Produces haploid gametes and is responsible for the development of the zygote into foetus.

(3 x 2) **(6)**

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 type of bond found between amino acids

1.2.2 The organelle in the cytoplasm on which protein synthesis occurs

1.2.3 A hormone that stimulates the maturation of sperms and puberty in males

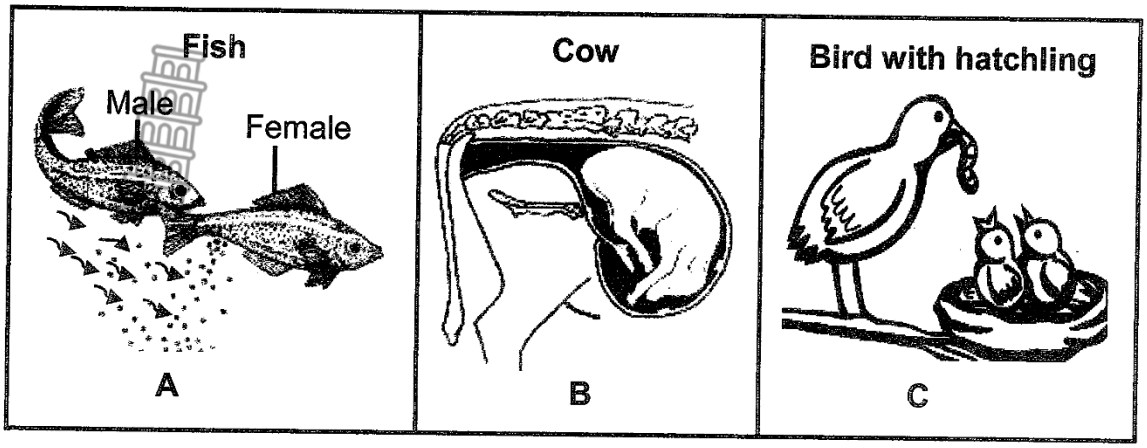
(3 x 1) **(3)**

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 1.3.3) in the ANSWER BOOK.

	COLUMN I	**COLUMN II**
1.3.1	Production of female gametes	A: Spermatogenesis B: Oogenesis
1.3.2	Location of DNA in a human cell	A: Nucleus B: Mitochondrion
1.3.3	The pair of chromosomes responsible for sex determination	A: Gonosomes B: Autosomes

(3 x 2) **(6)**

1.4 The diagrams below show reproductive strategies in different organisms.



1.4.1 Which of the diagrams (**A**, **B** or **C**) belong/s to:

(a) Viviparous (1)

(b) Altricial development (1)

(c) Precocial development (2)

1.4.2 State the type of fertilisation shown by fish in diagram **A**. (1)
(5)

TOTAL SECTION A: [20]

SECTION B

QUESTION 2

2.1 The **table A** below shows part of the DNA sequence.

Table A

DNA BASE TRIPLET NUMBER	1	2	3	4	5	6
DNA SEQUENCE	ACG	TGC	ACA	ATG	TGC	CAT

2.1.1 Write down the tRNA base triplet that codes for DNA base triplet number **6**. (1)

2.1.2 Explain the role of a DNA sequence during protein synthesis. (2)

2.1.3 The **table B** below shows the mRNA base triplets that code for different amino acids.

Table B

mRNA BASE TRIPLETS	AMINO ACID
AAA	Lysine
GUG	Valine
CCU	Proline
UAC	Tyrosine
ACG	Threonine
UGC	Cysteine

With reference to **table A** of DNA sequence and **table B** of mRNA base triplets that code for different amino acids above:

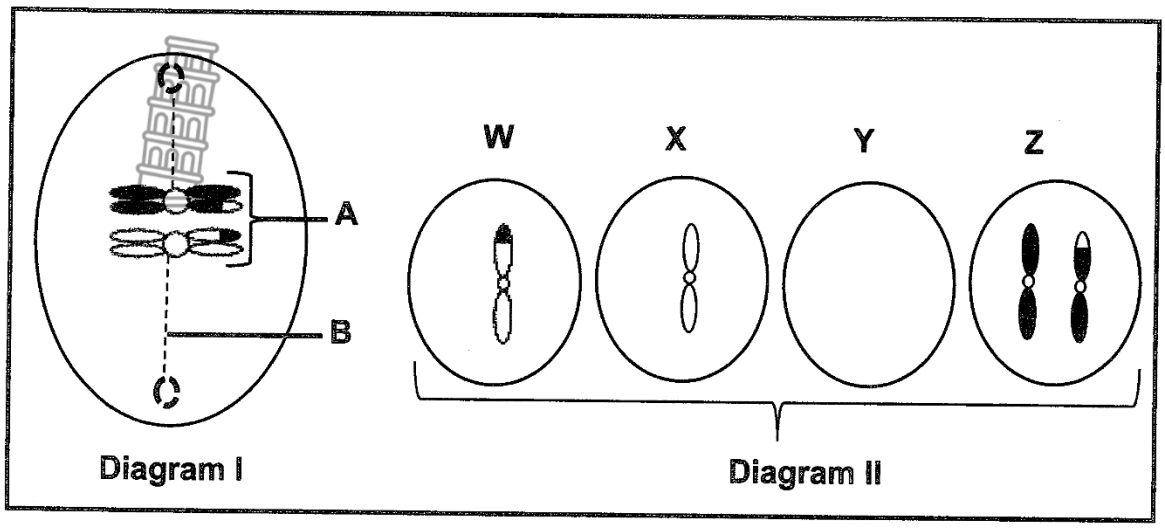
Write down the:

(a) Amino acid coded for by DNA base triplet number **5** (1)

(b) DNA base triplet that codes for tyrosine (1)
(5)

2.2 Describe the process of *DNA replication*. **(6)**

2.3 The diagrams below in no particular order show part of the phases in meiosis.



2.3.1 Identify structure:

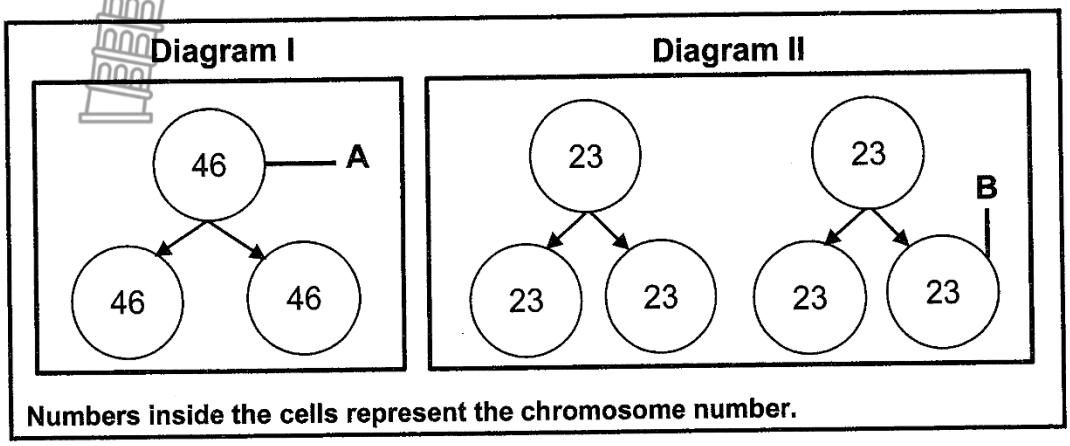
(a) A (1)

(b) B (1)

2.3.2 Explain why cell Y in diagram II does not have any chromosome. (2)
(4)
[15]

QUESTION 3

3.1 The diagrams below show part of mitosis and meiosis in human cells.

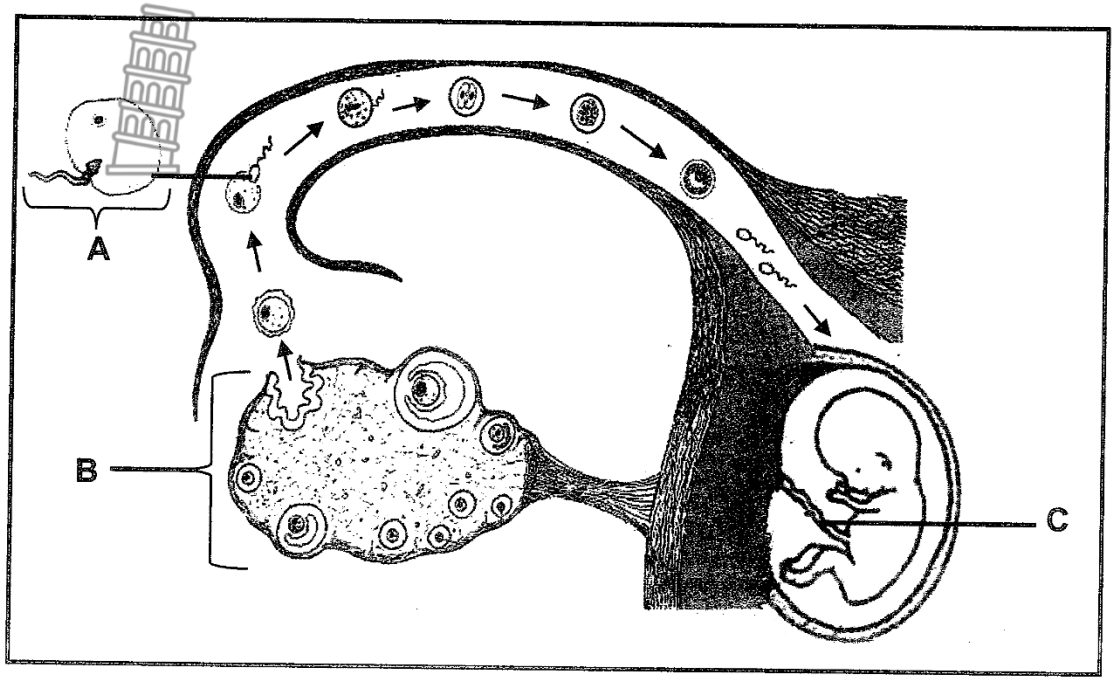


3.1.1 Name the type of cell division shown in diagram **I**. (1)

3.1.2 From the diagrams **I** and **II**, state ONE way in which mitosis is similar to meiosis II. (1)

3.1.3 Write down the LETTER only of the cell that represents the gamete. (1)
(3)

3.2 The diagram below shows the sequence of events that takes place in a part of the female reproductive system.



3.2.1 Identify process **A**. (1)

3.2.2 State ONE reason why the foetus would die if the vein in structure **C** was blocked. (1)

3.2.3 Explain the role of hormones produced by structure **B** during the menstrual cycle. (4)
(6)

3.3 An investigation was conducted to determine the effect of different amounts of progesterone on FSH level in the blood.

The procedure was as follows:

- 30 healthy, non-pregnant females of the same age were used.
- They were divided into three groups of 10 each (Group **A**, **B** and **C**).
- Their average FSH level was determined and recorded.
- Group **A** was given daily pills with progesterone which inhibits the production of FSH.
- Group **B** was injected monthly with trilostane (chemical substance) which decreases the production of progesterone more than under normal conditions.
- Group **C** was given no treatment.
- All three groups were exposed to the conditions above for 6 months.
- The average FSH level of all the groups were determined monthly.

3.3.1 Identify the dependent variable in the investigation. (1)

3.3.2 State ONE reason why the investigation was done for 6 months instead of 2 months. (1)

3.3.3 Give ONE factor that was kept constant during the investigation. (1)

3.3.4 Which group of females (**A**, **B** or **C**) would be expected to have the highest level of FSH for the duration of the investigation? (1)

3.3.5 Explain your answer in QUESTION 3.3.4. (2)
(6)
[15]

TOTAL SECTION B: [30]

GRAND TOTAL: [50]