



education

Department:
Education
PROVINCE OF KWAZULU-NATAL

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

**LIFE SCIENCES
COMMON TEST
MARCH 2020**

MARKS: 60

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

1.1.1 The process where one DNA molecule produces two identical DNA molecules is called ...

- A reproduction.
- B translation.
- C replication.
- D protein synthesis.

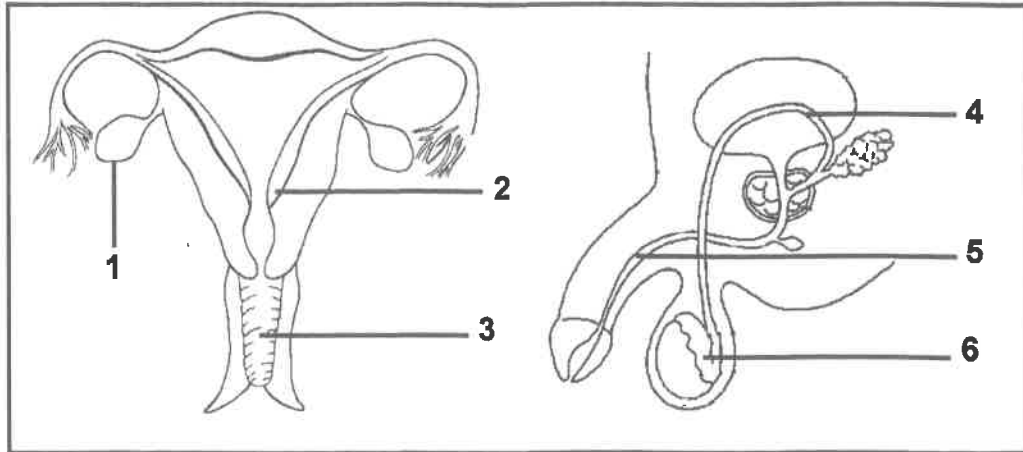
1.1.2 Study the table below that shows the success rate in solving criminal cases.

SUSPECTS	SUCCESS RATE IN SOLVING CRIMINALCASES (%)	
	TRADITIONAL METHOD	DNA PROFILING
Identified	14	44
Prosecuted	8	24
Arrested	14	30

A possible conclusion from this graph is that ...

- A more suspects have been prosecuted by using traditional method.
- B more suspects have been identified by using traditional method.
- C more suspects have been prosecuted than arrested by using traditional method.
- D more suspects have been identified and arrested by using DNA profiling.

1.1.3 Study the diagrams below.



Which ONE of the following combinations matches the labels with their correct function?

- A 5 - transports sperm cells from the epididymis, 2 – attachment of embryo
- B 3 - sperm cells are deposited, 6 - sperm cells are stored
- C 4 - provides nutrients for sperm cells, 1 – produce ova
- D 2 - fertilisation occurs, 6 – sperm cells mature

(3 x 2) (6)

1.2 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.

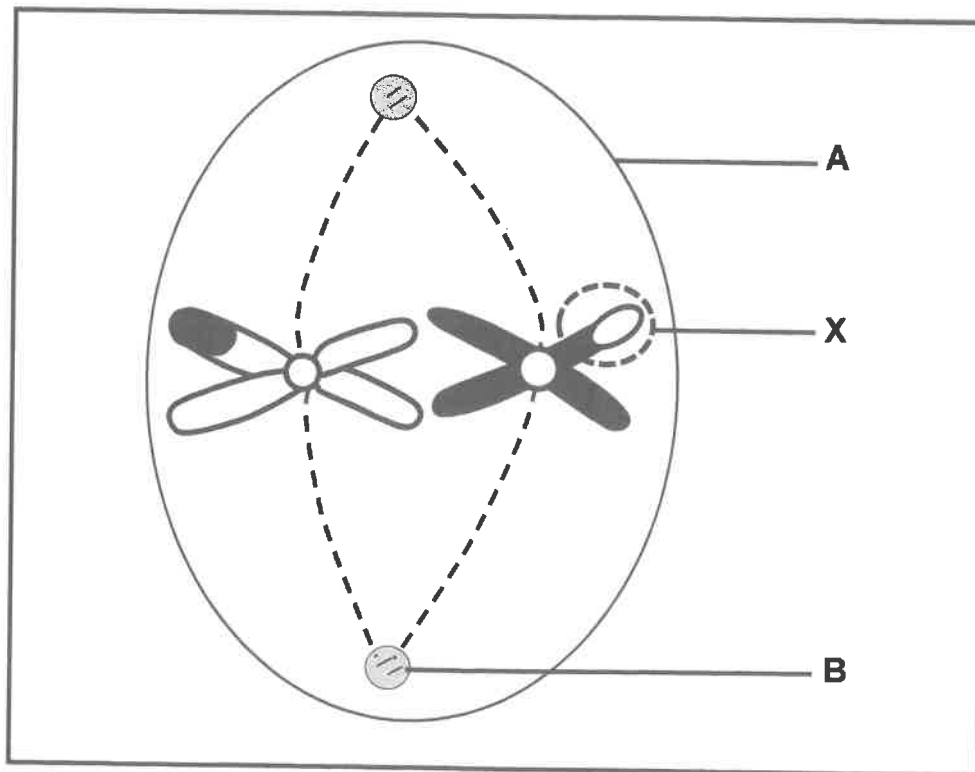
	COLUMN I	COLUMN II
1.2.1	Involved in the prevention of mechanical injuries in an amniotic egg	A: Chorion B: Amnion
1.2.2	Foetus is attached to the mother's uterus	A: Vivipary B: Ovovivipary

(2 x 2) (4)

TOTAL SECTION A: 10

SECTION B**QUESTION 2**

2.1 The diagram below represents phases of meiosis.



2.1.1 Identify:

(a) **A**

(1)

(b) **B**

(1)

2.1.2 Identify the phase of meiosis represented in the diagram above.

(1)

2.1.3 Describe the process responsible for the appearance of the chromosomes as shown in region X.

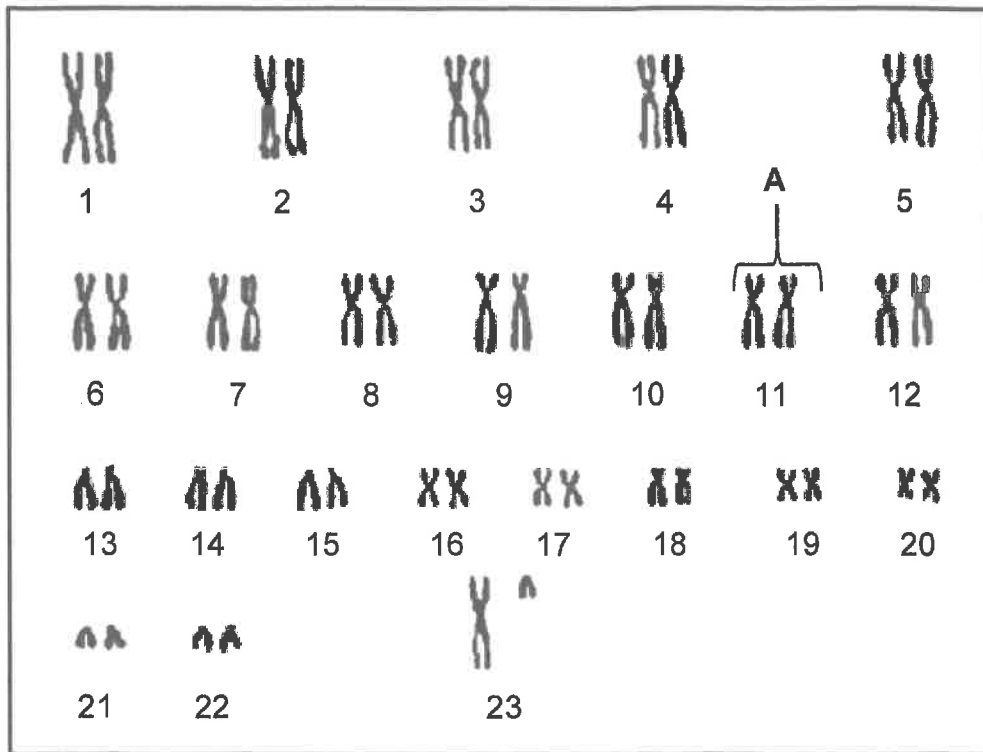
(4)

2.1.4 State TWO significance of meiosis.

(2)

(9)

2.2 The diagram below shows the human karyotype.



- 2.2.1 State the correct **biological term** for the chromosome pair number 23. (1)
- 2.2.2 Identify **A** in the diagram above. (1)
- 2.2.3 Explain the consequence if chromosome pair number 21 in a human cell fails to separate during meiosis. (4)
(6)

[15]

TOTAL SECTION B: 30

QUESTION 3

- 3.1 The diagram below shows some codons of mRNA together with their corresponding amino acids.

AAA	UCA	CUG	CAA	UGG	CUA	UGU	UAC
Phe	Ser	Asp	Val	Thr	Asp	Ser	Met

The base sequence of a section of tRNA used during translation is shown below.

GUU	AGU	ACC	ACA	AUG	UUU
1	2	3	4	5	6

- 3.1.1 How many different types of amino acids are required for the above tRNA strand during translation? (1)
- 3.1.2 Write down the complementary base sequence of the DNA strand that formed anticodon 5 of the tRNA. (1)
- 3.1.3 Explain the effect on the composition of the protein molecule if the base sequence at 4 was AGU instead of ACA. (2)
- 3.1.4 Describe the process of *translation*. (5)
- (9)

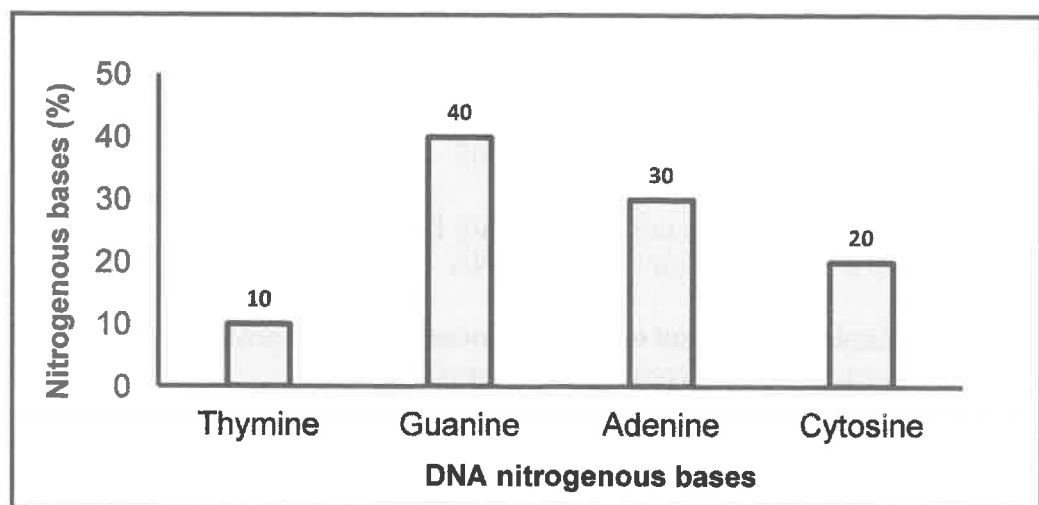
3.2 A DNA molecule is double stranded and helical in shape.

Scientists carried out a DNA analysis to determine the percentage of nitrogenous bases on **one strand** of a DNA molecule consisting of 450 nitrogenous bases.

The scientists:

- Took a sample of human blood
- Extracted a DNA molecule
- X-rayed the DNA molecule to get a profile
- Counted the number of each nitrogenous base in a DNA molecule
- Repeated the process 3 times
- Calculated the average percentage of nitrogenous bases on each strand

The graph below shows the percentage of bases on **STRAND 1** of a DNA molecule.



- 3.2.1 Identify the dependent variable in this investigation. (1)
- 3.2.2 State TWO ways in which the scientists ensured the reliability of the investigation. (2)
- 3.2.3 Calculate the number of guanine on **STRAND 2** of a DNA molecule that is the complimentary strand to the one shown on the graph above. Show all working. (3)
(6)
(15)

SECTION C**QUESTION 4**

Describe the role of ovarian hormones in menstrual cycle and the process of fertilisation. Also describe the role of umbilical cord in a developing foetus.

Content: (17)
Synthesis: (3)
(20)

NOTE: NO marks will be awarded for answers in the form of tables, flow charts or diagrams.

TOTAL SECTION C: 20
GRAND TOTAL: 60



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