



education

Department of
Education
FREE STATE PROVINCE

GRADE 12

LIFE SCIENCES

FORMAL TEST 2.1

MARCH 2022

MARKS: 50

TIME: 50 minutes

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 ALL drawings should be done in pencil and labeled in blue or black ink.
- 7 Only draw diagrams, flow charts and tables when asked to do so.
- 8 The diagrams in this question paper are NOT all drawn to scale.
- 9 Do NOT use graph paper.
- 10 Non-programmable calculators, protractors and compasses may be used.
- 11 Write neatly and legibly.

SECTION A

QUESTION 1

1.1 Various options are given as possible answers to the following questions. Choose the correct answer and write only the letter (A to D) next to the question number (1.1.1 to 1.1.3) in your ANSWER BOOK, for example 1.1.4.D.

1.1.1 The part of the female reproductive system where fertilisation takes place is the ...

- A vagina.
- B ovary.
- C fallopian tube.
- D cervix.

1.1.2 A sample of DNA has 60 guanine bases and 30 adenine bases. How many phosphate molecules would you expect in this sample of DNA?

- A 30
- B 90
- C 180
- D 270

1.1.3 In a plant cell the DNA is found in the ...

- A mitochondria and ribosomes.
- B nucleus and chloroplasts.
- C ribosomes and nucleus.
- D chloroplasts and ribosomes.

(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 your ANSWER BOOK.

1.2.1 The stage when secondary sexual characteristics develop in male and female individuals

1.2.2 The type of development in birds where the hatchling's eyes are open and their bodies are covered with soft feathers

1.2.3 The monomers of nucleic acids

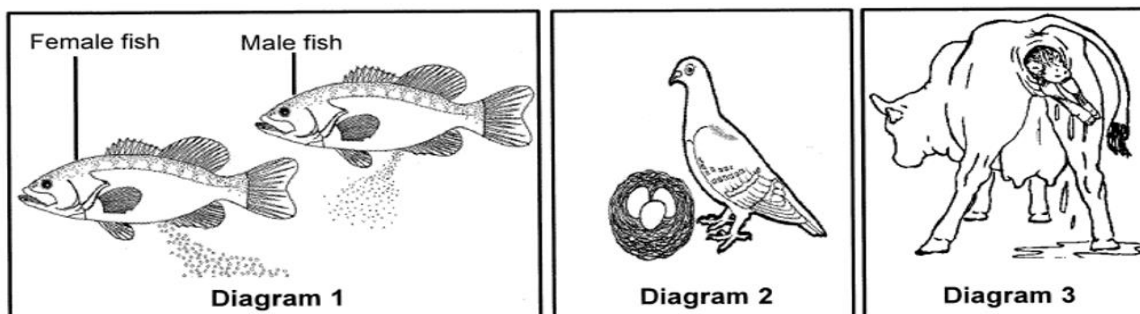
(3 x 1) **(3)**

- 1.3 Indicate whether each of the statements 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 DNA patterns that show the characteristics of an individual	A DNA profile B Human fingerprints
1.3.2 Contain large number of mitochondria	A Ovum B Sperm
1.3.3 The bonds that form between nitrogenous bases in a DNA molecule	A Peptide bonds B Hydrogen bonds

(3 x 2) (6)

- 1.4 The diagrams below represent organisms with different reproductive strategies.



- 1.4.1 Which diagram(s) (1, 2 or 3) represent(s) organisms:

- (a) Where external fertilisation takes place (1)
- (b) Where extra-embryonic membranes develop to assist with the protection and nutrition of the embryo (2)
- (c) That provide parental care. (1)

- 1.4.2 Name the type of egg produced by the organism represented in Diagram 2 (1)
(5)

TOTAL SECTION A: 20

SECTION B

QUESTION 2

2.1 The table and the key below show the menstrual cycle of a woman during the month of February 2022.

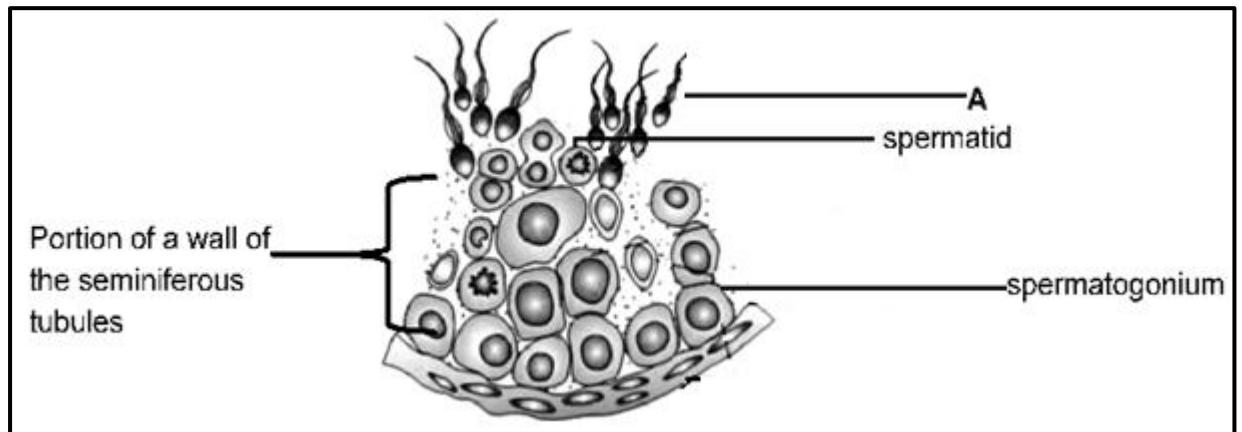
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28					

KEY

Menstruation
Ovulation

- 2.1.1 Name the hormone of which the secretions will be at its maximum on day 17. (1)
- 2.1.2 Describe the negative feedback between FSH and progesterone if fertilisation does not occur after day 17. (3)
(4)

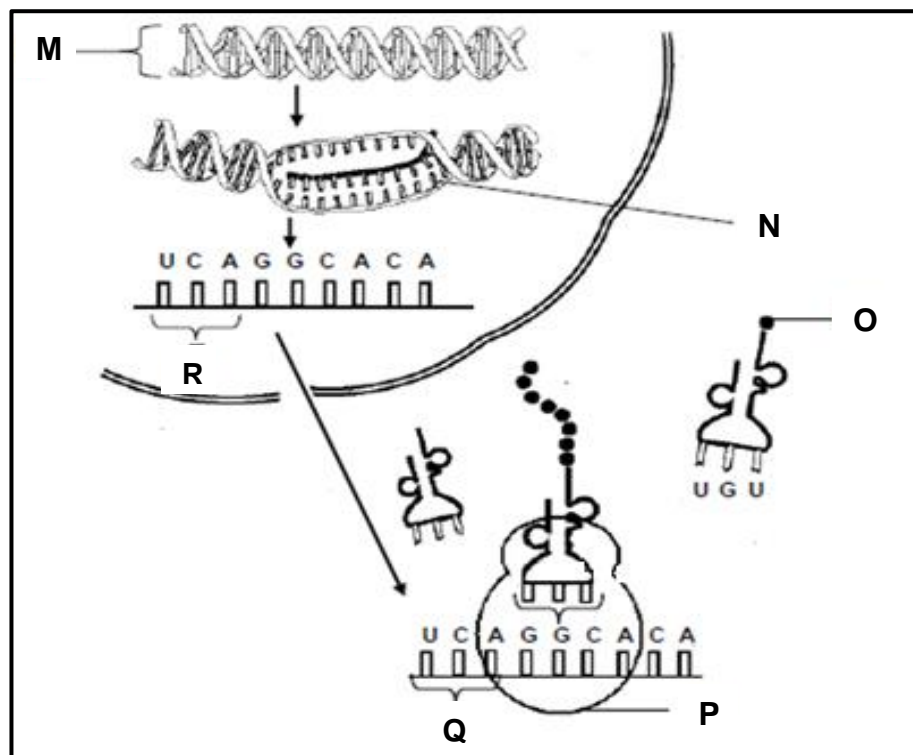
2.2 The diagram below represents a cross-section of a human seminiferous tubule illustrating a certain process.



2.2.1 Name the specific process illustrated in the seminiferous tubule which leads to the formation of cell **A**. (1)

2.2.2 How many chromosomes are there in one spermatogonium cell? (1)
(2)

2.3 The diagram below represents the process of protein synthesis



2.3.1 Identify:

- (a) Molecule **M** (1)
- (b) Organelle **P** (1)
- (c) The stage of protein synthesis illustrated by **N** (1)

2.3.2 Give the nitrogenous bases on the DNA strand that code for **R**. (2)

2.3.3 The table below shows the base triplets of DNA and the amino acid each one codes for.

Base triplets of DNA	Amino acid coded for
AGT	Serine
CCG	Glycine
TGT	Threonine
GTA	Histidine
CAA	Valine
TCC	Arginine
ACA	Cysteine

(a) Name the amino acid labelled **O** in the diagram. (2)

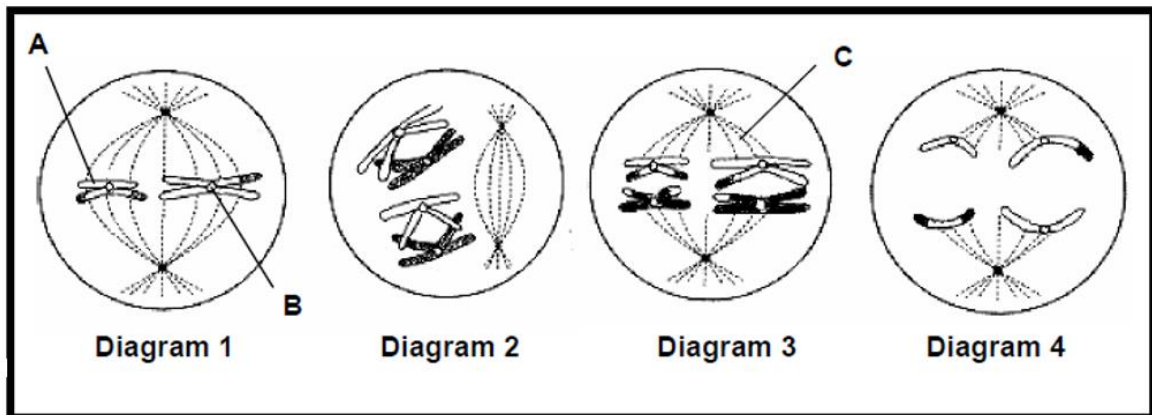
2.3.4 As a result of a mutation in the formation of the mRNA, codon **Q** reads **UGU** instead of **UCA**.

Describe the effect of this mutation on the formation of the protein. (2)
(9)

TOTAL QUESTION 2: (15)

QUESTION 3

3.1 Study the following diagrams representing different phases of meiosis.



- 3.1.1 Identify structures **A** and **B**. (2)
- 3.1.2 Give the function of **C**. (1)
- 3.1.3 Which phase is represented by Diagram 1? (1)
- 3.1.4 Name TWO processes that ensure that the gametes produced at the end of meiosis are genetically different from each other. (2)
- (6)

- 3.2 A learner wanted to investigate the relationship between the number of babies born with Down syndrome and the age of their mothers. He obtained information from local clinics.

The table below shows the results obtained.

Age of mothers giving birth	Number of babies born with Down's syndrome (per 100 births)
21-25	3
26-30	5
31-35	11
36-40	25
41-45	50

- 3.2.1 Identify the independent variable for this investigation. (1)
- 3.2.2 What conclusion can be drawn from the results obtained in the investigation? (2)
- 3.2.3 Use the results to draw a histogram. (6)
- (9)

TOTAL QUESTION 3: (15)

TOTAL SECTION B (30)

GRAND TOTAL (50)