Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 12

SEPTEMBER 2022

LIFE SCIENCES P2

MARKS: 150

TIME: 2½ hours

This question paper consists of 16 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 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. ALL drawings MUST be done in pencil and labelled 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 must use a non-programmable calculator, protractor and a compass, where necessary.
11. All calculations to be rounded off to TWO decimal spaces.
12. Write neatly and legibly.

SECTION A

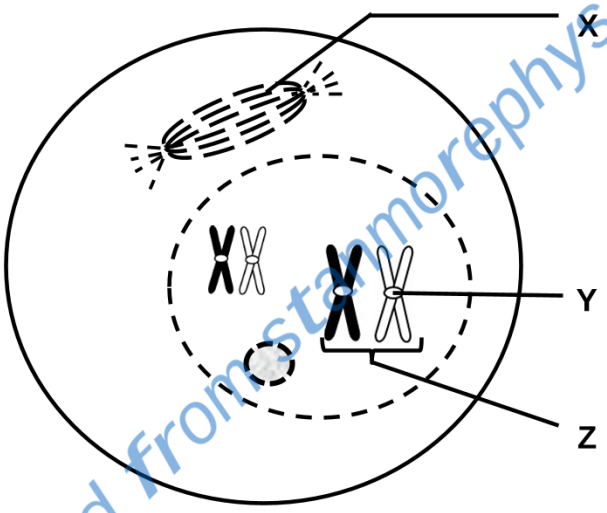
QUESTION 1

1.1 Various options are provided as possible answers to the following questions. Choose the correct answer and write only the letter (A–D) next to the question numbers (1.1.1 to 1.1.10) in the ANSWER BOOK, for example 1.1.11 D.

1.1.1 Which ONE of the following CORRECTLY describes the four cells produced by meiosis?

A Haploid and are genetically different
B Diploid and are genetically identical
C Diploid and are genetically different
D Haploid and are genetically identical

1.1.2 The diagram below shows a cell during Prophase 1.



Which ONE of the following are the correct labels for X, Y and Z in the diagram?

A X – Spindle fibre; Y – centriole; Z – chromosome
B X – Centriole; Y – chiasma; Z – homologous chromosomes
C X – Spindle fibre; Y – centromere; Z – homologous chromosomes
D X – Centromere; Y – centriole; Z – chromosome

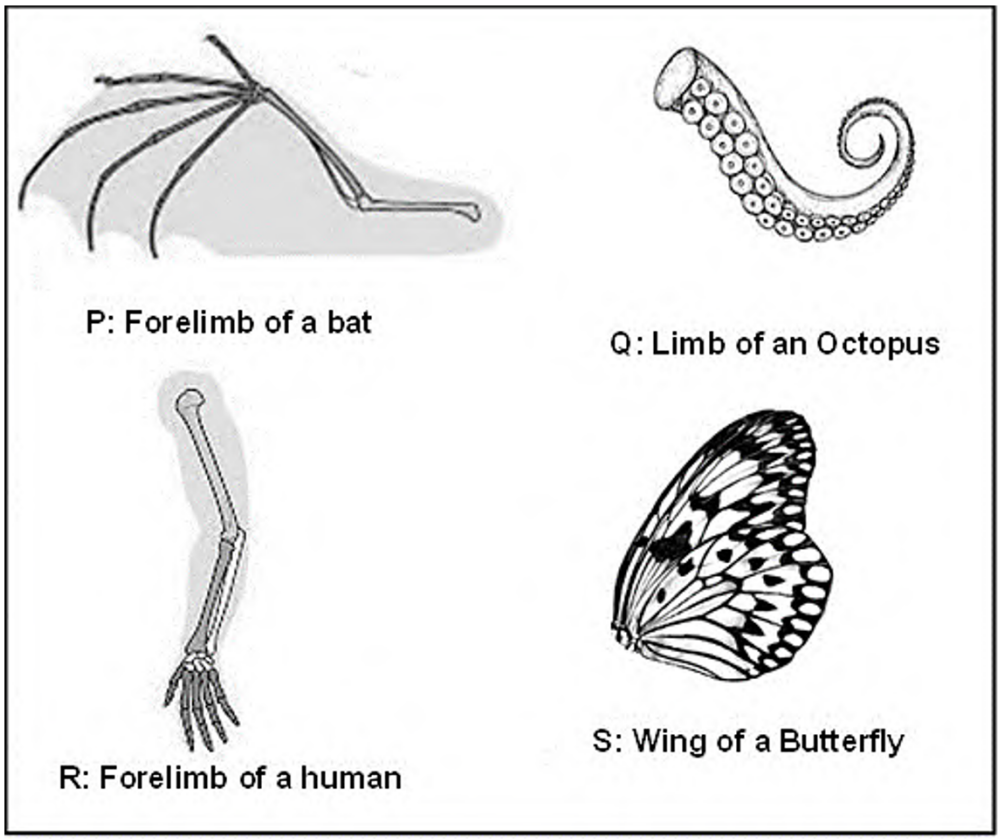
1.1.3 Which ONE of the following is the biological importance of meiosis?

A Repairs worn out cells
B Production of gametes in humans
C Production of somatic cells in humans
D Responsible for growth in organisms

1.1.4 How many mRNA nucleotides code for a protein made up of 120 amino acids?

A 30
B 40
C 360
D 120

1.1.5 The diagram below represents the appendages of the four different organisms.



Which TWO limbs are homologous structures?

A P and Q
B Q and R
C P and R
D P and S

1.1.6 Speciation has occurred when …

A two populations can no longer interbreed and produce fertile offspring.
B populations are separated by a geographical barrier.
C populations go extinct.
D a mutation has occurred in an individual organism.

1.1.7 The chromosome complements in a cell of an individual who inherits an X chromosome from the father is …

A 44 and XX.
B 44 and XY.
C 46 and XX.
D 46 and XY.

QUESTIONS 1.1.8 AND 1.1.9 REFER TO THE FOLLOWING DIHYBRID CROSS.

In rabbits, fur colour and fur length are controlled by two genes. Black fur (**B**) is dominant over white fur (**b**) and long fur (**L**) is dominant over short fur (**l**). Two rabbits, 1 and 2, were mated.

The table below shows the possible gametes that can be produced by each rabbit.

	Possible gametes			
Rabbit 1	bl	bl	bl	bl
Rabbit 2	BL	Bl	bL	bl

1.1.8 Which ONE of the following is the phenotype of rabbit **2**?

A White with short fur
B Black with short fur
C White with long fur
D Black with long fur

1.1.9 Which ONE of the following are possible genotypes of the offspring of rabbit **1** and **2**?

A bbll, BbLl, Bbll, bbLl
B BbLL, Bbll, bbll, BBLL
C BBLL, BbLl, Bbll, bbll
D BbLl, Bbll, BbLL, bbLL

1.1.10 A woman with blood group **A** married a man and had four children with blood groups as shown in the table below.

Child 1	**Child 2**	**Child 3**	**Child 4**
A	O	A	B

The genotype of the man is …

A I^Ai.
B I^AI^B.
C I^BI^B.
D I^Bi.

(10 x 2) (20)

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 1.2.8) in the ANSWER BOOK.

1.2.1 A point where chromatids overlap during crossing over

1.2.2 A segment of DNA that codes for a particular protein

1.2.3 A phase before cell division during which DNA replication takes place

1.2.4 Genetic material that is used to trace female ancestry

1.2.5 A pattern of dark bands derived from genetic material and that is unique to each individual

1.2.6 Evolution characterised by long periods of little or no change followed by short periods of rapid change

1.2.7 A group of organisms with similar characteristics, occupying the same habitat at the same time and are able to interbreed to produce fertile offspring

1.2.8 The change in the genetic composition of a species over time

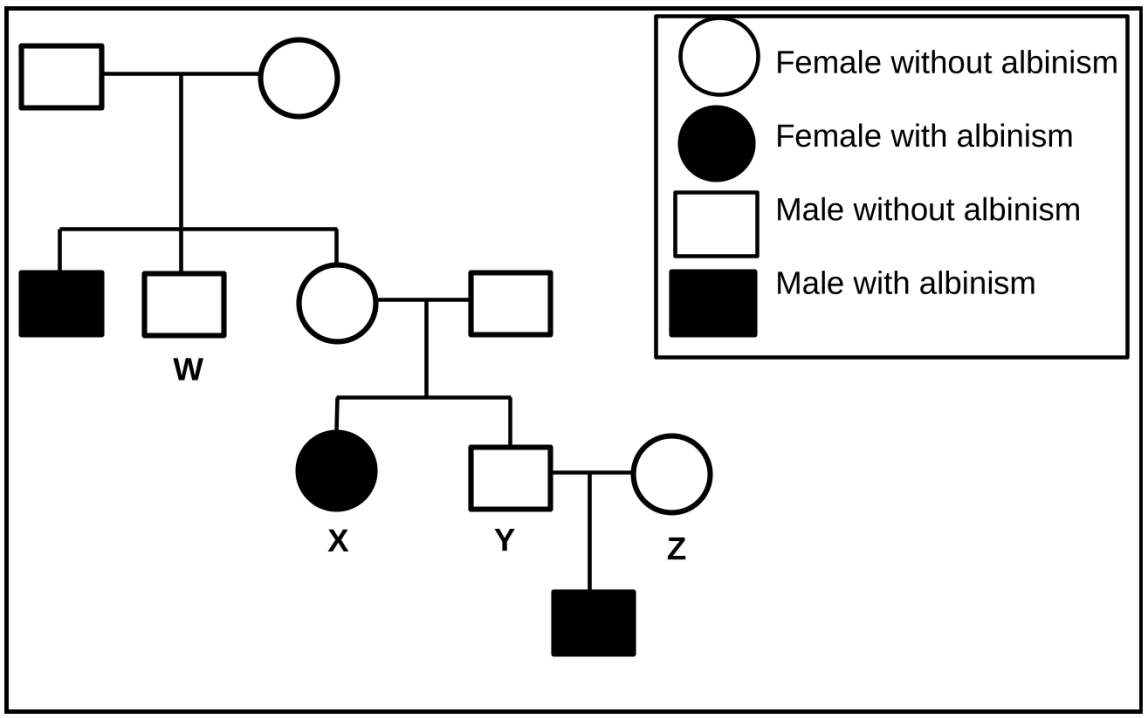
(8 x 1) (8)

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 numbers (1.3.1 to 1.3.3) in the ANSWER BOOK.

COLUMN I		COLUMN II	
1.3.1	As evidence for evolution	A: B:	Biogeography Meiosis
1.3.2	Site of meiosis	A: B:	Uterus Ovaries
1.3.3	An event that occurs during Metaphase II	A: B:	Crossing over Random arrangement of chromosomes

(3 x 2) (6)

1.4 Albinism is a skin disorder caused by a recessive allele on an autosome.
The pedigree diagram below represents the inheritance of albinism in a family.
Use **N** for normal skin colour and **n** for albinism**.**



1.4.1 How many generations are represented in the pedigree diagram? (1)

1.4.2 Give the:

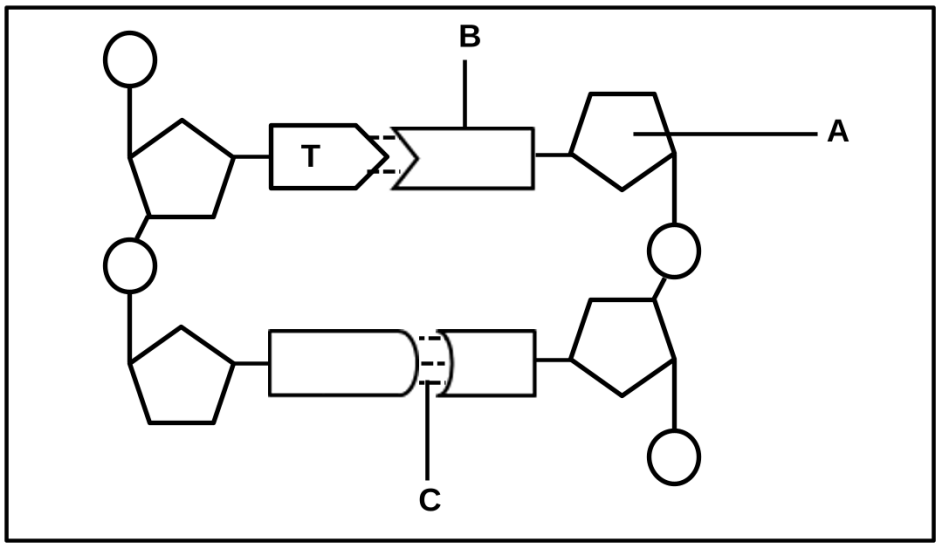
(a) Phenotype of individual **W** (1)

(b) Genotype of individual **X** (2)

(c) Genotype of individual **Y** (2)

1.4.3 What is the percentage chance of individuals **Y** and **Z** having a child without albinism? (2)

1.5 The diagram below shows a short section of a DNA molecule.



1.5.1 What is the natural shape of a DNA molecule? (1)

1.5.2 Identify:

(a) Sugar **A** (1)

(b) The nitrogenous base **B** (full name required) (1)

(c) Bond **C** (1)

1.5.3 Give TWO visible reasons why the diagram above represents a DNA molecule. (2)

1.5.4 Name TWO structures in a non-dividing human cell where DNA is found. (2)

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 A sequence of nitrogenous bases in a DNA molecule is shown below.

CCC – GGT – TCA

2.1.1 Write down the mRNA codon sequence that reads from left to right from the DNA sequence above. (2)

2.1.2 The table below shows the tRNA anticodons and their corresponding amino acids.

Anticodon	Amino Acids
CAA	Valine
CCC	Glycine
CGU	Alanine
AAA	Phenylalanine
UUA	Asparagine
UAC	Methionine
GGU	Proline
ACC	Tryptophan
UCA	Serine

Write down the amino acids (in the correct sequence) that would be coded for by the DNA molecule above. (3)

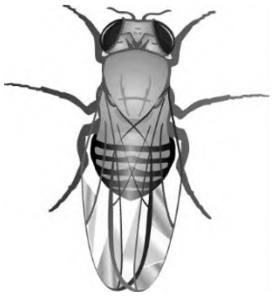
2.1.3 During transcription the first triplet in the DNA sequence changed from **CCC** to **ACC**.

Explain how this would affect the protein that is formed. (4)

2.1.4 Describe the role of tRNA in translation. (2)

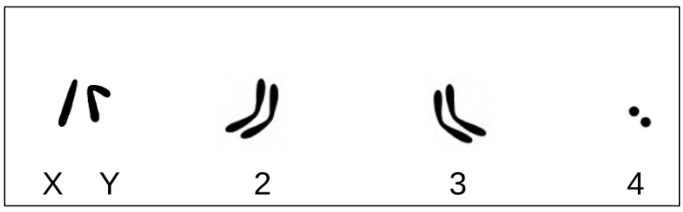
2.1.5 Tabulate TWO differences between the process of DNA replication and transcription. (5)

2.2 The diagram below shows the karyotypes of male and female fruit flies.

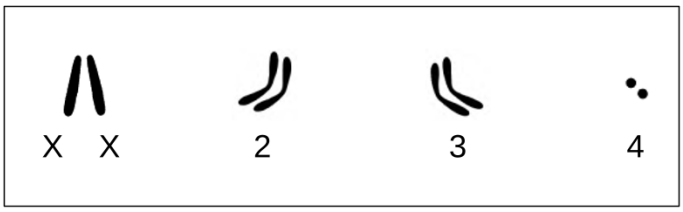


Fruit Fly

Karyotype of a male fruit fly



Karyotype of a female fruit fly



2.2.1 State what is meant by the term *karyotype*. (2)

2.2.2 What is the diploid number of chromosomes of this species of fruit fly? (1)

2.2.3 Describe how sex determination in fruit flies is similar to humans. (2)

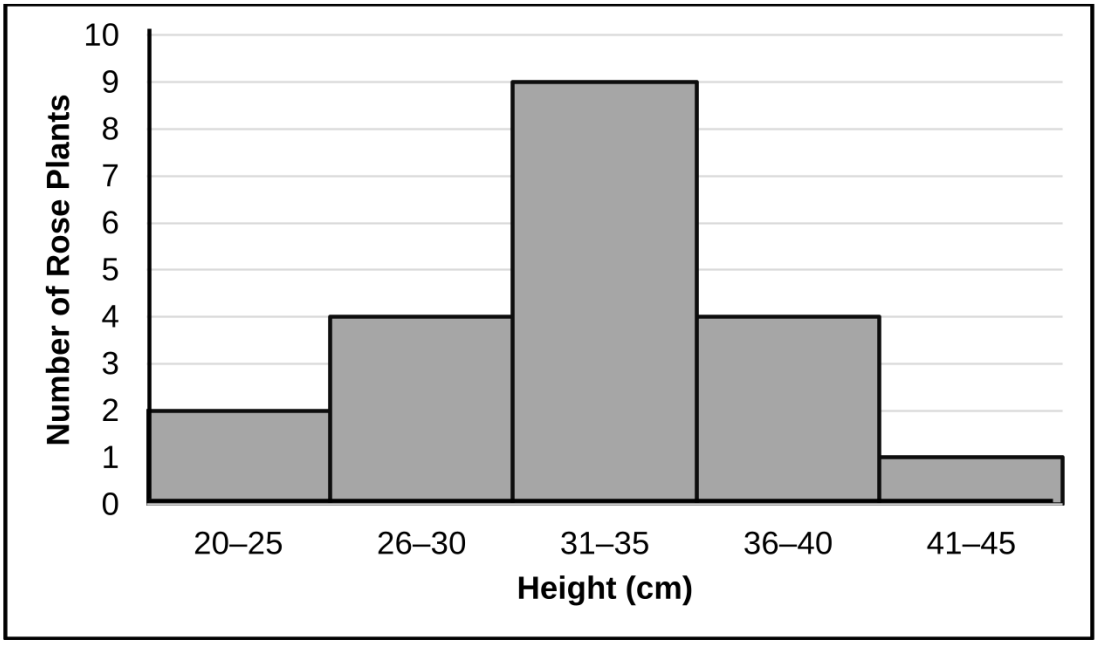
2.3 The gene for eye-colour in fruit flies is carried on the X-chromosome and therefore is sex linked. The allele for red eye colour is dominant ($\mathbf{X^R}$) over the allele for white eye colour ($\mathbf{X^r}$).

2.3.1 State Mendel's Law of dominance. (2)

2.3.2 A heterozygous female is mated with a white-eyed male.

Use a genetic cross to show the possible genotypes and phenotypes of the offspring. (7)

2.4 The histogram below shows the range of heights in a sample of rose plants.



2.4.1 What type of variation is shown by the height of rose plants? (1)

2.4.2 Give a reason for your answer in QUESTION 2.4.1. (2)

2.4.3 Rose flowers with long stems sell for the highest price because the long-stemmed flowers look beautiful in a vase.
Plant breeders select plants with the longest stems to interbreed. And these long-stemmed plants do not necessarily survive in the wild because wind can bend and break them.

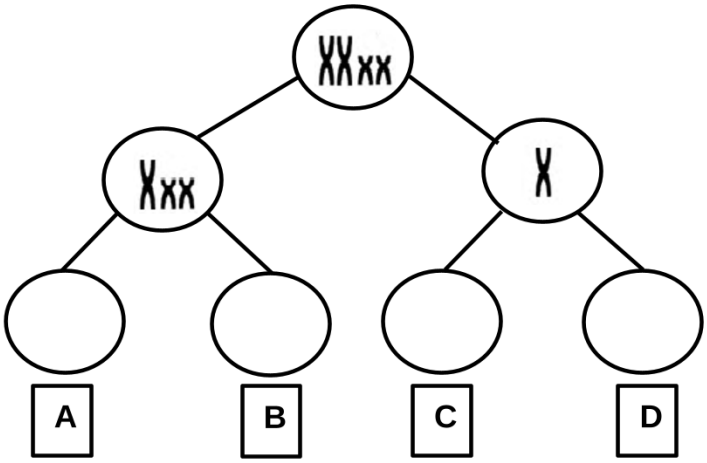
Explain how this practice of interbreeding long-stemmed flowers is an example of artificial selection and not natural selection. (4)

2.4.4 When rose plants with yellow flowers are crossed with rose plants with red flowers, the offspring all have orange flowers.

What is this type of dominance called? (1)

2.4.5 A plant breeder **only** has plants with **orange** flowers. Can she produce red offspring from these flowers? Explain your answer. (3)

2.5 The diagram below shows a cell which has undergone a non-disjunction of chromosomes during meiosis.



2.5.1 During which phase of meiosis did this non-disjunction of chromosomes occur? (1)

2.5.2 Name the type of mutation that will result from non-disjunction of chromosomes. (1)

2.5.3 Explain the disorder that will result from non-disjunction of chromosome pair 21 in humans. (4)

2.5.4 Draw cell **A** to show the chromosome composition after meiosis 2 of this cell division. (2)

2.5.5 Name the type of cells that will be produced in a male at the end of meiosis. (1)

[50]

QUESTION 3

3.1 Cloning is used to produce a variety of domestic animals. However, the cost to produce a cloned animal can be up to R300 000.

Scientists conducted an investigation to determine the success rate of cloning in different animals.

The success rate is determined as the percentage of young born live from the embryos transferred to the mother.

The table below shows the number of embryos transferred to the surrogate mother and the number of young that were born live from cloned embryos.

Animal	Number of embryos transferred to the surrogate mother	Number of young born live	Percentage success rate
Sheep	110	50	46
Cattle	250	70	28
Goats	26	8	31
Pigs	9	5	56

3.1.1 State ONE reason why these results are considered reliable. (1)

3.1.2 Identify the dependent variable in this investigation. (1)

3.1.3 Draw a bar graph to compare the percentage success rate in the different animals. (6)

3.1.4 State ONE benefit of cloning. (1)

3.1.5 Using the information given, explain TWO disadvantages of cloning cattle for meat production. (4)

3.2 Read the extract below.

A MOVE TOWARDS NO TUSKS – AN ELEPHANT'S STORY OF NATURAL SELECTION

The study of African elephants in Gorongosa National Park, Mozambique, found that a genetic condition which resulted in tuskless females had become more common after the 15-year civil war. Over 90% of Mozambique's elephant population were killed and the ivory used to finance the war.

Before the war only two out of every hundred female African elephants were born tuskless. But that figure has risen, 33% of the 91 female elephants born since the end of the war were tuskless.

Elephants normally eat grass, leaves, fruit, bark of trees and the roots of legumes. However, the tuskless elephants are shifting their diet. Without long tusks to peel bark from trees and dig up roots, the females eat mostly grass.

Now the scientists are studying how this will affect the species and its environment.

Elephant with tusks

Tuskless Elephant

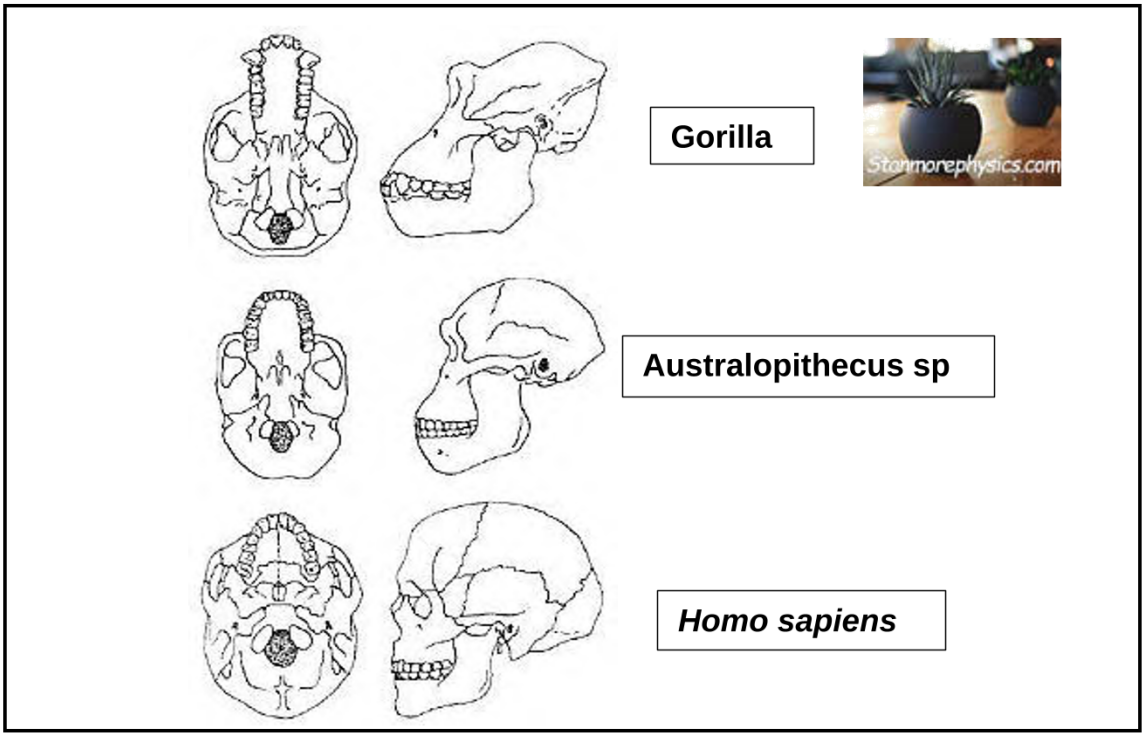
3.2.1 From the extract, write down a sentence that explains the natural diet of elephants WITH TUSKS. (1)

3.2.2 Calculate the number of tuskless female elephants born since the end of the war. (3)

3.2.3 Explain the evolution of the tuskless elephant population, using Darwin's theory of natural selection. (5)

3.2.4 Explain how the change in the elephant's diet will affect the vegetation, if the number of tuskless elephants increases. (2)

3.3 The diagram below shows the skulls of the three hominids.



3.3.1 Give TWO structural features of the Australopithecus sp. skull that are more similar to the gorilla than *Homo sapiens*. (2)

3.3.2 Explain how the size of the canines in gorilla is used as evidence for their diet. (2)

3.3.3 What is a *foramen magnum*? (1)

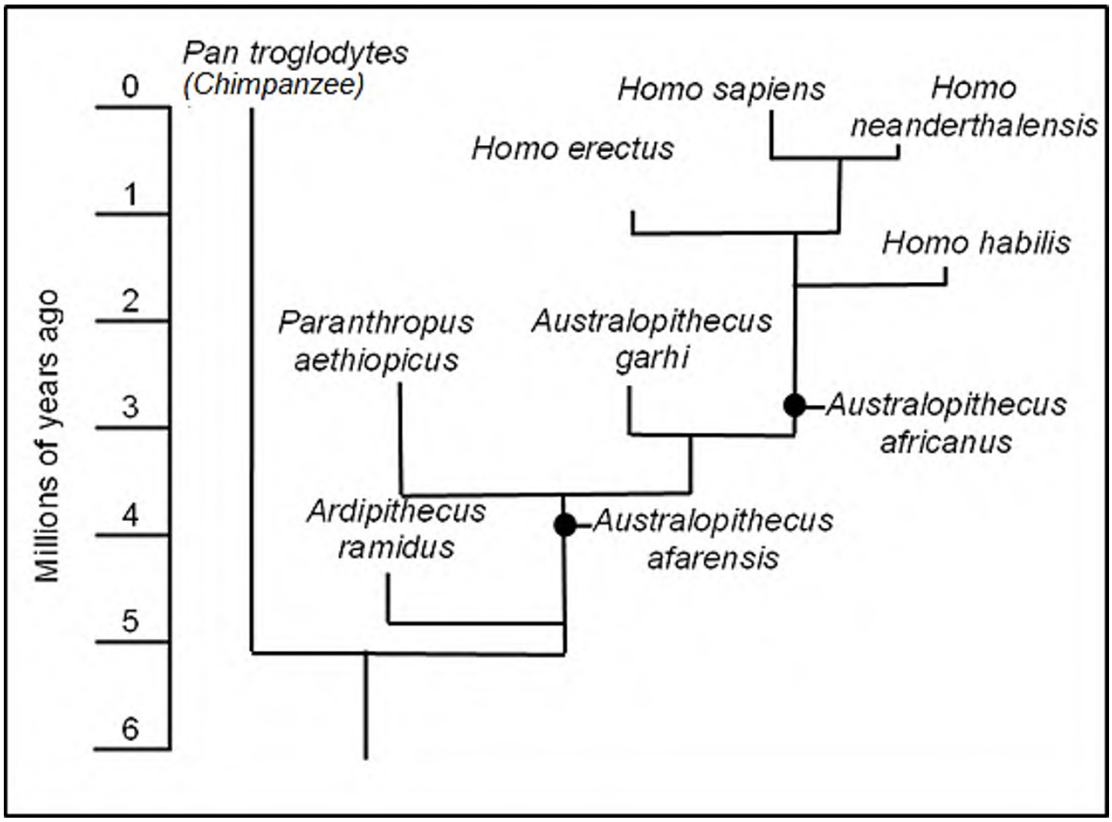
3.3.4 The position of the foramen magnum in *Homo sapiens* differs from the position in a gorilla.

Explain what this tells us about the way that these two hominids moved around. (4)

3.3.5 Explain the significance of an increased cranium size in the evolution of *Homo sapiens.* (2)

3.4 Describe how the age and location of hominid **fossils** support the 'Out of Africa' hypothesis. (5)

3.5 The diagram below shows possible evolutionary relationships amongst some hominids.



3.5.1 What is this type of diagram called? (1)

3.5.2 How many genera are represented in this diagram? (1)

3.5.3 When did *Homo erectus* become extinct? (1)

3.5.4 Name the most recent common ancestor of all the Homo species. (1)

3.5.5 Explain why *Homo erectus* cannot be seen as the direct ancestor for *Homo sapiens*. (2)

3.5.6 According to the diagram above, name ONE species that may have been outcompeted by *Homo sapiens.* (1)

3.5.7 Name the scientist who discovered *Australopithecus sediba* in the Malapa Caves – in the Cradle of Humankind. (1)

3.5.8 Name TWO sites where *Australopithecus africanus* fossils were discovered in South Africa. (2)
[50]

TOTAL SECTION B: 100
GRAND TOTAL: 150

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NATIONAL SENIOR CERTIFICATE

GRADE 12

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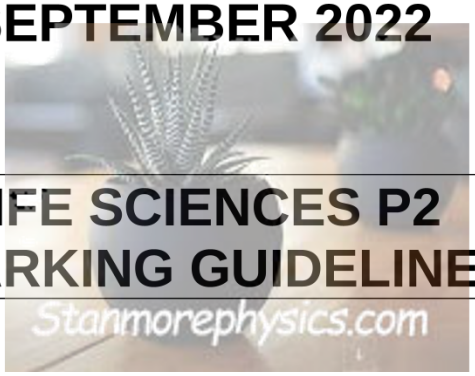


LIFE SCIENCES P2
MARKING GUIDELINE

MARKS: 150

This marking guideline consists of 10 pages.

PRINCIPLES RELATED TO THE MARKING OF LIFE SCIENCES

1. **If more information than marks allocated is given**
   Stop marking when maximum marks is reached and put a wavy line and 'max.' in the right-hand margin.

2. **If, for example, three reasons are required and five are given**
   Mark the first three irrespective of whether all or some are correct/incorrect.

3. **If whole process is given when only a part of it is required**
   Read all and credit the relevant parts.

4. **If comparisons are asked for but descriptions are given**
   Accept if the differences/similarities are clear.

5. **If tabulation is required but paragraphs are given**
   Candidates will lose marks for not tabulating.

6. **If diagrams are given with annotations when descriptions are required**
   Candidates will lose marks.

7. **If flow charts are given instead of descriptions**
   Candidates will lose marks.

8. **If sequence is muddled and links do not make sense**
   Where sequence and links are correct, credit. Where sequence and links are incorrect, do not credit. If sequence and links become correct again, resume credit.

9. **Non-recognised abbreviations**
   Accept if first defined in answer. If not defined, do not credit the unrecognised abbreviation but credit the rest of the answer if correct.

10. **Wrong numbering**
    If answer fits into the correct sequence of questions but the wrong number is given, it is acceptable.

11. **If language used changes the intended meaning**
    Do not accept.

12. **Spelling errors**
    If recognisable, accept the answer, provided it does not mean something else in Life Sciences or if it is out of context.

13. **If common names are given in terminology**
    Accept, provided it was accepted at the national memo discussion meeting.

14. **If only the letter is asked for but only the name is given (and vice versa)**
    Do not credit.

15. **If units are not given in measurements**
Candidates will lose marks. Marking guideline will allocate marks for units separately.

16. **Be sensitive to the sense of an answer, which may be stated in a different way.**

17. **Caption**
All illustrations (diagrams, graphs, tables, etc.) must have a caption.

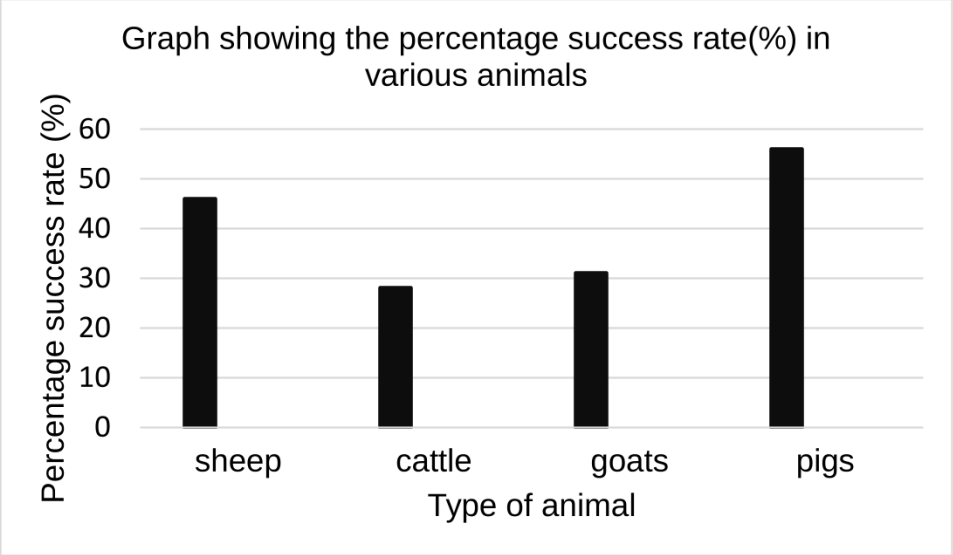
18. **Code-switching of official languages (terms and concepts)**
A single word or two that appear(s) in any official language other than the learners' assessment language used to the greatest extent in his/her answers should be credited, if it is correct. A marker that is proficient in the relevant official language should be consulted. This is applicable to all official languages.

LIFE SCIENCES PAPER 2 ERRATA

2.3.2 The genotype X^rX^r in the Punnet square is incorrect.
The correct genotype should be X^rY

Gametes	X^r	**Y**
X^R	$X^R X^r$	$X^R Y$
X^r	$X^r X^r$	$X^r Y$
Correct genotypes ✓		

3.1.3 Correction on the graph for the percentage success rate of pigs which should be 56%



3.5.7 The name of the scientist has been spelled incorrectly. The correct spelling is Prof. Lee Berger✓

SECTION A

QUESTION 1

1.1	1.1.1	A ✓✓		
	1.1.2	C ✓✓		
	1.1.3	B ✓✓		
	1.1.4	C ✓✓		
	1.1.5	C ✓✓		
	1.1.6	A ✓✓		
	1.1.7	A ✓✓		
	1.1.8	D ✓✓		
	1.1.9	A ✓✓		
	1.1.10	D ✓✓	(10 x 2)	(20)

1.2	1.2.1	Chiasma ✓/ chiasmata		
	1.2.2	Gene ✓		
	1.2.3	Interphase ✓		
	1.2.4	Mitochondrial DNA ✓		
	1.2.5	DNA profile ✓		
	1.2.6	Punctuated equilibrium ✓		
	1.2.7	Population ✓		
	1.2.8	(Biological) evolution ✓	(8 x 1)	(8)

1.3	1.3.1	A only ✓✓		
	1.3.2	B only ✓✓		
	1.3.3	B only ✓✓	(3 x 2)	(6)

1.4	1.4.1	4 ✓		(1)
	1.4.2	(a) Male without albinism ✓		(1)
		(b) nn ✓✓		(2)
		(c) Nn ✓✓		(2)
	1.4.3	75 ✓✓%		(2)

1.5	1.5.1	(Double) Helix ✓		(1)
	1.5.2	(a) Deoxyribose ✓		(1)
		(b) Adenine ✓		(1)
		(c) Hydrogen ✓ bond		(1)
	1.5.3	• Double stranded ✓ • Has thymine ✓ not uracil • Nitrogenous bases are in pairs ✓ **(Mark first TWO only)**	(Any 2 x 1)	(2)
	1.5.4	Nucleus ✓ Mitochondrion ✓ **(Mark first TWO only)**		(2)

TOTAL SECTION A: 50

QUESTION 2

2.1 2.1.1 GGG - CCA- AGU ✓✓ (ALL or NONE) (2)

2.1.2 Glycine ✓ - Proline ✓ - Serine ✓ (3)

2.1.3
- The codon would change to UGG ✓
- The anticodon with ACC ✓
- will bring the tryptophan ✓
- instead of glycine ✓
- sequence of amino acids will change ✓ /a different protein will form

(Any 4 x 1) (4)

2.1.4
- Each tRNA carries a specific amino acid ✓
- to the codon on the mRNA ✓/ ribosome (2)

2.1.5

DNA Replication	Transcription
Two DNA strands are used as template ✓	One DNA strand is used as template ✓
Free DNA nucleotides join ✓ to DNA template	Free RNA nucleotides join ✓ to DNA template
Whole DNA unwinds	A part of DNA unwinds
A pairs with T	A pairs with U

Table ✓

Mark first TWO only (Any 2 x 2 + 1) (5)

2.2 2.2.1 The number and appearance/type of chromosomes in the cell of an organism. ✓✓ (2)

2.2.2 8 ✓ (1)

2.2.3
- Females are XX ✓
- and males are XY ✓ (2)

2.3 2.3.1
- When two homozygous organisms with contrasting characteristics are crossed, ✓
- all the individuals of the F1 generation will display the dominant trait ✓

OR

- An individual that is heterozygous for a particular characteristic ✓
- will have the dominant trait as the phenotype ✓ (Any 1 x 2) (2)

2.3.2

P_1	Phenotype	Red-eyed female	x	White-eyed male ✓	
	Genotype	$X^R X^r$ ✓	x	$X^r Y$ ✓	
Meiosis					
	G/gametes	X^R , X^r	x	X^r , Y ✓	
Fertilisation					
F_1	Genotype	$X^R X^r$; $X^R Y$; $X^r X^r$; $X^r Y$ ✓*			
	Phenotype	1 Red-eyed female : 1 red-eyed male: 1 white-eyed female : 1 white-eyed male ✓*			

P_1 and F_1 ✓
Meiosis and fertilisation ✓ (**Any 5 + *2 Compulsory)**

OR

P_1	Phenotype	Red eyed female	x	White eyed male ✓	
	Genotype	$X^R X^r$ ✓	x	$X^r Y$ ✓	
Meiosis					
	G/gametes	X^R, X^r	x	X^r, Y ✓	

Fertilisation
F_1

Gametes	X^r	**Y**
X^R	$X^R X^r$	$X^R Y$
X^r	$X^r X^r$	$X^r X^r$
Correct genotypes ✓*		

Phenotype: 1 Red eyed female: 1 red eyed male: 1 white eyed female: 1 white eyed male ✓*

P_1 and F_1 ✓
Meiosis and fertilisation ✓ (**Any 5 + *2 Compulsory)** (7)

2.4 2.4.1 Continuous ✓ variation (1)

2.4.2 There is a range of intermediate phenotypes ✓✓/heights (2)

2.4.3
- Plant breeders/people select ✓ characteristic and
- not nature selecting ✓ characteristic
- They select those characteristics that are desirable to them ✓/ people
- and is not beneficial to survival ✓ (2 x 2) (4)

2.4.4 Incomplete ✓ dominance (1)

2.4.5 Yes ✓

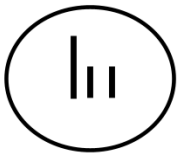
- The orange flowers carry one red allele ✓/ are heterozygous
- If both plants pass on one red allele ✓ the offspring will be red (3)

2.5 2.5.1 Anaphase 1 ✓ (1)

2.5.2 Chromosomal ✓mutation (1)

2.5.3
- A gamete with an extra copy of chromosome 21 ✓ will be formed
- If this gamete fuses with a normal gamete ✓/ gamete with 23 chromosomes
- A zygote with 47 chromosomes ✓/ an extra copy of chromosome 21 will be formed
- This will lead to Down syndrome ✓ (4)

2.5.4



- Three single stranded chromosomes drawn ✓
- Correct size of three chromosomes ✓ (2)

2.5.5
- Sperm ✓ cells / spermatozoa (1)

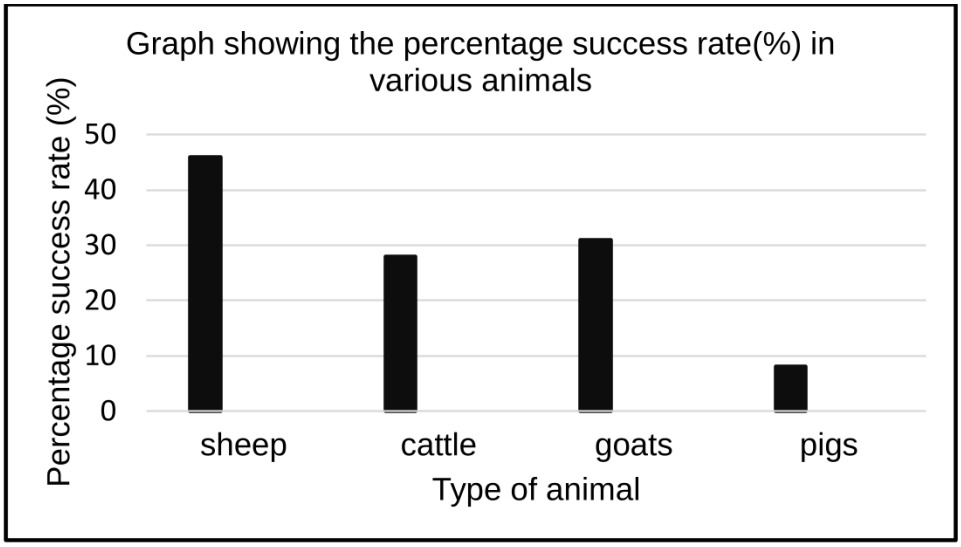
[50]

QUESTION 3

3.1 3.1.1 Many embryos were transferred into the surrogate mothers ✓/ large sample size of embryos was used. (1)

3.1.2 Success rate of cloning ✓ (1)

3.1.3



Guideline for assessing graph

CRITERIA	ELABORATION	MARK
Correct type of graph (T)	Bar graph	1
Caption of Graph (C)	Both variables included	1
Axes labels (L)	x- and y-axis correctly labelled	1
Scale for x- and y-axis	Equal space between bars and width of bars for x-axis and -correct scale for y-axis	1
Plotting of bars	1 to 3 bars plotted correctly All 4 bars plotted correctly	1 2

(6)

3.1.4 - Produce organisms with desired traits ✓ e.g. health; appearance; nutritious; yield; shelf-life; etc.
- Conservation of threatened species ✓
- To create tissues/organs for transplant ✓
- Replace damaged tissue ✓
- Prevent genetic diseases ✓
- Improve food supply/quality ✓

Mark first ONE only (Any 1 x 1) (1)

3.1.5 The cost of cloning is very high ✓/ costs R300 000
The meat would be too expensive ✓
The success rate is low ✓/ success rate is 28%
It would take a long time/effort to produce each cow. ✓ (4)

3.2 3.2.1
- Elephants normally eat grass, leaves, fruit, bark of trees and the roots of legumes. ✓ (1)

3.2.2 $\frac{33}{100}$ ✓ x 91 ✓ = 30 ✓ female elephants (3)

3.2.3
- There is a great deal of variation amongst the population of elephants ✓
- Some have tusks, and some do not ✓
- When there was an increase in poaching ✓
- Elephants without tusks, survived ✓
- whilst elephants with tusks, were killed ✓
- The elephants that survived, reproduced ✓
- and pass on the allele for the favourable characteristic to their offspring ✓
- The next generation therefore had a higher proportion of individuals without tusks. ✓ (Any 5 x 1) (5)

3.2.4
- There will be more legumes and trees ✓
- and less grass ✓
- as elephants now eat more grass ✓/less legumes/ less bark (Any 2 x 1) (2)

3.3 3.3.1
- Is more prognathous ✓
- Have smaller cranium ✓
- Have larger jaws ✓
- Have more U-shape jaw ✓
- Have prominent brow ridges ✓ (Any 2 x 1)

(**Mark first TWO only**) (2)

3.3.2
- They ate more raw food ✓
- and therefore, have large teeth ✓ to tear and rip (2 x 1) (2)

3.3.3 The hole at the base of the skull where the spinal cord leaves/enters the skull. ✓ (1)

3.3.4
- In *Homo sapiens* the foramen magnum is in a forward position ✓
- therefore, are bipedal ✓
- In the gorilla the foramen magnum is in a backward position ✓
- therefore, are quadrupedal ✓/not bipedal (4)

3.3.5
- *Homo sapiens* have a larger brain ✓
- and therefore, more intelligent ✓ (2)

3.4
- *Oldest* fossils of *Ardipithecus* found in Africa ONLY ✓
- *Australopithecus* fossils found in Africa ONLY ✓
- fossils of *Homo habilis* found in Africa ONLY ✓
- Oldest fossils of *Homo erectus found in Africa* ✓
- Oldest fossils of *Homo sapiens* found in Africa ✓
- while the younger fossils of *Homo erectus* / *Homo sapiens* were found in other parts of the world ✓ (Any 5 x 1) (5)

3.5 3.5.1 Phylogenetic tree ✓ (1)

3.5.2 5 ✓ (1)

3.5.3 1 mya ✓ (1)

3.5.4 *Australopithecus africanus* ✓ (1)

3.5.5
- There is no direct line from *Homo erectus* to *Homo sapiens* ✓ because
- *Homo erectus* and *Homo sapiens* both evolved from a *common ancestor* ✓ (2)

3.5.6 *Homo neanderthalensis* ✓ (1)

3.5.7 Prof. Lee Burger ✓ (1)

3.5.8 Sterkfontein Caves ✓/Cradle of Humankind
Taung ✓ (2)

[50]

TOTAL SECTION B: 100
GRAND TOTAL: 150