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

SEPTEMBER 2026

LIFE SCIENCES P2
MARKING GUIDELINE

MARKS: 150

This marking guideline consists of 11 pages.

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PRINCIPLES RELATED TO MARKING 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 part.

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.

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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.

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SECTION A

QUESTION 1

1.1	1.1.1	D ✓✓		
	1.1.2	B ✓✓		
	1.1.3	C ✓✓		
	1.1.4	B ✓✓		
	1.1.5	A ✓✓		
	1.1.6	A ✓✓		
	1.1.7	D ✓✓		
	1.1.8	B ✓✓		
	1.1.9	B ✓✓		
	1.1.10	D ✓✓	(10 x 2)	(20)
1.2	1.2.1	Messenger RNA ✓/mRNA		
	1.2.2	Colour-blindness ✓		
	1.2.3	Protein ✓		
	1.2.4	Stem cells✓		
	1.2.5	Nitrogenous base ✓		
	1.2.6	Cradle of humankind ✓		
	1.2.7	Anticodon ✓		
	1.2.8	Cultural evidence ✓	(8 x 1)	(8)
1.3	1.3.1	B only ✓✓		
	1.3.2	None ✓✓		
	1.3.3	A only ✓✓	(3 x 2)	(6)
	1.4.1	(a) Codominance ✓		(1)
		(b) Incomplete✓dominance		(1)
	1.4.2	RW ✓		(1)

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	1.4.3	(a)	Monohybrid ✓cross	(1)
		(b)	Pink flower ✓colour	(1)
		(c)	(Law of) segregation ✓	(1)
	1.4.4		1 red coat : 2 roan coat : 1 white coat ✓✓	(2)
1.5	1.5.1		Artificial selection ✓	(1)
	1.5.2		- High milk production ✓/ high average milk yield - Disease resistance ✓ **(Mark first TWO only)**	(2)
	1.5.3	(a)	5^{th} ✓generation	(1)
		(b)	1^{st} ✓ generation	(1)
	1.5.4	(a)	Biological ✓ evolution	(1)
		(b)	Continuous ✓ variation	(1)
		(c)	Line ✓ graph	(1)

TOTAL SECTION A: 50

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SECTION B

QUESTION 2

2.1 2.1.1 Two/2 ✓ (1)

2.1.2 Neighbour ✓ (1)

2.1.3
- 2 DNA bands on the child's ✓ DNA profile
- match those of the mother's DNA profile ✓
- All the remaining DNA bands of the child match with the DNA bands of the neighbour ✓ (3)

2.1.4
- Identification of genetic disorders ✓
- Matching tissues for organ transplants ✓ (2)

2.1.5
- The DNA profile produced from the crime scene DNA sample is compared with the DNA profiles produced from DNA samples collected from suspects ✓
- DNA bands from the crime scene are compared to the DNA bands of the possible suspect(s) ✓
- If all the DNA bands of the crime scene DNA sample match the DNA bands of the suspect ✓.
- Then the suspect is the culprit ✓/committed the offence/was present at the crime scene when the offense was made. Any 3 (3)

2.2 2.2.1 Telophase I ✓ (1)

2.2.2 (a) (It) "condenses"/ (shortens and thickens) to form chromatids ✓ (1)

(b) (It) replicates/DNA replication occurs (1)

2.2.3
- Chromosomes consist of TWO identical chromatids ✓
- which are joined at a centromere ✓
- Each chromatid contains a DNA molecule ✓
- with the same sequence of genes ✓ (4)

2.2.4
- in Anaphase II ✓
- centromere split/sister chromatids separate/pulled to opposite poles of the cell ✓ (2)

2.2.5 (a) Cytokinesis ✓ (1)

(b)
- Aurora B kinase gene mutation involves a change in the nucleotide/ nitrogenous base sequence of a DNA ✓ molecule whilst
- Down syndrome is characterised by a **chromosomal** mutation ✓/change in the number of chromosomes
- At position 21 ✓ (3)

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2.3
- A sperm is a gamete ✓
- produced by meiosis ✓
- Therefore, it must have haploid number/23 chromosomes
- to overcome the doubling effect of fertilisation ✓ (4)

2.4 2.4.1 452×3 ✓

= 1 356 ✓ nucleotides (2)

2.4.2 (a) PAH gene is found on chromosome 12 ✓/gene causing PKU is not found on the gonosomes /sex chromosomes (1)

(b) Can cause intellectual disability ✓ in humans (1)

2.4.3 (a) Translation ✓ (1)

(b) A change in the sequence of nucleotides on a DNA molecule ✓ (1)

(c)
- The DNA base triplet changes to ACC from GCC ✓
- mRNA codon will be UGG instead of CGG ✓
- tRNA anticodons will be ACC instead of GCC ✓
- leading to amino acid Tryptophan instead of arginine ✓
- A defective enzyme is formed, which cannot not change phenylalanine in the liver to tyrosine ✓*

Any 3 + *1 compulsory (4)

2.5 2.5.1 Homozygous recessive ✓ (1)

2.5.2 (a) Four ✓/4 (1)

(b) Nn ✓ (1)

(c) Male with PKU ✓ (1)

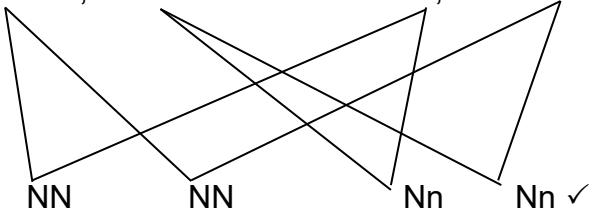
2.5.3
- The occurrence of PKU will be lower ✓/ PKU is less prevalent in this pedigree
- Since PKU is caused by two recessive alleles ✓
- The dominant allele masks the recessive allele in a heterozygous condition ✓ (3)

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2.5.4 P1 Phenotype Male without PKU X Female without PKU ✓
Genotype Nn X NN ✓

Meiosis
Gametes N , n X N, N ✓

Fertilisation



F_1 genotype NN NN Nn Nn ✓
Phenotype (100%) offspring without PKU ✓
50% chance of having a child with heterozygous genotype ✓*

P1 and F1 ✓
Meiosis and fertilization ✓

P1 Phenotype Male without PKU X Female without PKU ✓
Genotype Nn X NN ✓

Meiosis

Fertilisation

Gametes	**N**	**n**
N	NN	Nn
N	NN	Nn
1 mark for correct gametes 1 mark for correct genotypes		

Phenotype (100%) offspring without PKU ✓
50% chance of having a child with heterozygous genotype ✓*

P1 and F1 ✓
Meiosis and fertilization ✓

Any 5 + *1 compulsory (6)
[50]

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QUESTION 3

3.1 3.1.1 Agriculture ✓ (1)

3.1.2
- Decreases appetite ✓
- Makes the person feel full ✓

(Mark first TWO only) (2)

3.1.3
- A plasmid is removed ✓ from a bacterium
- It is cut-open using special enzymes ✓
- The **GLP-1 gene** is removed from a human pancreatic cell ✓* and
- inserted into the plasmid to form the recombinant DNA ✓
- Recombinant DNA is re-inserted into the bacterium ✓
- The bacterium is placed in the fermentation tank to reproduce many identical bacteria ✓
- The bacteria produces semaglutide which is extracted to make wegovy pills ✓*/medication

(2 Compulsory marks* + any 3) (5)

3.1.4 Pills are easy to self-administer at home while injections often require medical assistance/ carry risk of infection ✓✓

OR

Pills are painless while needles are painful and people are scared of needles ✓✓ (2)

3.2 3.2.1 (a) Consuming naturally fermented fruit ✓ (1)

(b) To ensure reliability ✓ of the investigation (1)

3.2.2
- Measuring the alcohol vapour inside the fruit ✓
- Chemical tests that change colour when ethanol (alcohol) is present. ✓

(Mark first TWO only) (2)

3.2.3
- A control group would not ingest naturally fermented fruit ✓
- In order to establish whether alcoholic concentration is due to fermented fruit intake or not✓ (2)

3.2.4 $\frac{3}{100}$ ✓x 470 ✓ = 14,1 ✓g (3)

3.2.5
- Fruits have low concentration of alcohol ✓
- Chimpanzees have become resistant/used to alcohol in fruits ✓ (2)

3.3 3.3.1 (a) Biogeography ✓ (1)

(b) Speciation ✓ (1)

3.3.2 Habitat isolation ✓
These lizards occupy different islands separated by oceans ✓ (2)

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3.3.3
- All South-island lizards had smaller heads with a weaker bite force ✓
- Due to changes in diet from eating insects to eating tough plant material ✓
- Lizards used their jaws more to grind tough plant material ✓
- South-island lizards evolved/developed larger heads with a stronger bite force ✓ due to large jaws
- The larger head with a stronger bite force was acquired ✓ by the offspring
- and passed on to future generations ✓ (5)

3.3.4
- The population/ancestral population of the Italian wall lizard species become separated into three islands ✓* by oceans ✓
- The population separated into three/3 populations ✓*
- There was no gene flow between the three/3 populations ✓
- Each population became exposed to different environmental conditions ✓
- natural selection occurred independently in each of the three populations ✓
- such that the individuals of the (three/3) populations become very different from each other ✓
- genotypically and phenotypically ✓
- even if the three populations were to mix again ✓
- they will not be able to interbreed ✓
- Three different species are now formed, the North-island, Central-island and South-island lizards ✓*. **3 compulsory*** + Any 3 (6)

3.4 3.4.1 (a) Foramen magnum ✓ (1)

(b) Brow ridge ✓ (1)

3.4.2
- Five/5 fingers ✓/digits in each hand
- Opposable thumb ✓
- Nails ✓

(Mark first THREE only) (3)

3.4.3
- the vertebral column of A. afarensis is less S-shaped ✓/curved than H. sapiens
- but more curved ✓ compared to primitive hominids (2)

3.4.4 **T** ✓

A. afarensis	***H. sapiens***
Eats raw/harder food ✓	Eats softer/cooked food ✓

(Mark first ONE only) Table 1 + 2 (3)

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3.4.5
- Fossils of *Australopithecus* were found in Africa only ✓
- Fossils of *Homo habilis* were found in Africa only ✓
- The oldest fossils of *Homo erectus and homo sapiens* were found in Africa ✓/the younger fossils of *Homo erectus and homo sapiens* were found in other parts of the world
- This indicates that humans originated in Africa and migrated from Africa to the rest of the world ✓ (4)

[50]

TOTAL SECTION B: 100
GRAND TOTAL: 150

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