LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
EDUCATION

NATIONAL

SENIOR CERTIFICATE

GRADE 12

CORRECTED LIFE SCIENCES P2
TRIAL EXAMINATION
MARKING GUIDELINE
2025

MARKS: 146

This memorandum consists of 11 pages including this one.

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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 part of it is required**
   Read all and credit relevant part.

4. **If comparisons are asked for and descriptions are given**
   Accept if 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 becomes correct again, resume credit.

Non-recognized abbreviations

9. Accept if first defined in answer. If not defined, do not credit the unrecognised abbreviation but credit the rest of 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 recognizable, accept, provided it does not mean something else in Life Sciences or if it is out of context.

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

14. **If only letter is asked for and only name is given (and vice versa)**
    No credit.

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15. **If units are not given in measurements**
Memorandum will allocate marks for units separately, except where it is already given in the question.

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

17. **Caption**
Credit will be given for captions to all illustrations (diagrams, graphs, tables, etc.) except where it is already given in the question.

18. **Code-switching of official languages (terms and concepts)**
A single word or two that appears 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 B✓✓
1.1.2 C✓✓
1.1.3 A✓✓
1.1.4 D✓✓
1.1.5 C✓✓
1.1.6 B✓✓
1.1.7 B✓✓
1.1.8 D✓✓
1.1.9 C✓✓
1.1.10 D✓✓ **(20)**

1.2
1.2.1 Anaphase I✓
1.2.2 Co-dominance✓
1.2.3 Foramen magnum✓
1.2.4 DNA Replication✓/ Replication
1.2.5 Hypothesis✓
1.2.6 Genetic engineering✓
1.2.7 Phenotype✓
1.2.8 Phylogenetic tree✓/ Cladogram
1.2.9 Anticodons✓ **(9)**

1.3
1.3.1 B Only✓✓
1.3.2 A Only✓✓
1.3.3 A Only ✓✓ **(6)**

1.4
1.4.1 X = centromere✓
Y = chiasma✓ / chiasmata (2)
1.4.2 Ovary✓ (1)
1.4.3 (a) Crossing over✓ (2)
(b) Prophase I✓
1.4.4 C → B → A ✓ (1)
1.4.5 - Production of haploid gametes ✓
- Halving effect of meiosis overcomes the doubling during fertilisation thus maintaining a constant chromosome number from one generation to the next ✓
- Mechanism to introduce genetic variation through:
  - crossing over
  - The random arrangement of chromosomes at the equator✓ (3)
(9)

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1.5
- Both involve the division of a parent cell into daughter cells✓
- Both processes include same basic stages: prophase, metaphase, anaphase, and telophase✓
- DNA replicates once during the interphase before both processes begin✓
- Both use spindle fibers to separate chromosomes or chromatids. ✓

(Any 3) **(3)**

1.6 1.6.1 Suspect 2 ✓ (1)

1.6.2 - Identification of relatives / tracing siblings/ missing persons✓
- Paternity testing ✓
- Diagnosis of genetic disorders✓
- To determine matching tissues for organ transplants✓
- Research into variation in populations✓
- Identify dead bodies (2)

(Mark the first two) **(3)**
50

TOTAL QUESTION 1

SECTION B

QUESTION 2

2.1 2.1.1 - DNA carries hereditary information✓
- DNA contains coded information for protein synthesis✓

(Mark first ONE only) (1)

2.1.2 ACA ✓ (1)

2.1.3 Threonine✓; Cysteine✓

(must be in correct order) (2)

2.1.4 - Both ATG and ATA✓
- Code for the same amino acid/tyrosine✓ so the protein is unchanged (2)

(6)

2.2 -Each tRNA carries a specific amino acid✓
-When the anticodon on the tRNA✓
-matches the codon on the mRNA✓
-then tRNA brings the specific amino acid✓
to the ribosome✓
- Amino acids become attached to each other by peptide bonds✓
- to form the required protein✓

(Any 5) **(5)**

2.3

Component	DNA	RNA
Sugar type	Contains Deoxyribose sugar✓	Contains a Ribose sugar✓

(1x2) and One for the table **(3)**

2.4 2.4.1 - Fannie has short fingers and straight hair✓
- Rose has normal fingers and curly hair✓ (2)

2.4.2 bH✓, bh✓ (If a learner wrote all the possible gametes, mark the first two only) (2)

2.4.3 Due to random arrangement of chromosomes at the equator ✓ during meiosis ✓ any one of the two alleles of a characteristic can sort with any one of another characteristic✓

The alleles of different genes move independently ✓ of each other into the gametes ✓

They can therefore appear in the gametes in different combinations: BH, Bh, bH, bh ✓ (4)

(8)

2.5 2.5.1 (a) I^BI^B✓ or I^Bi✓ (2)

(b) ii ✓✓ (2)

2.5.2 I^A✓ I^B ✓ (2)

2.5.3 The baby's genotype is ii (blood group O), which requires two O alleles.✓
Mr Mashilo has genotype AB and cannot contribute an O allele✓
Therefore, he cannot be the biological father✓ (3)

2.5.4 Blood type can be used to exclude a particular man✓ as the parent but it cannot confirm that a particular man is the father✓
Since a large portion of the population have the same blood type✓
(Any 2) (2)
(11)

2.6 - Normal females have two X✓ chromosomes
- Normal males have one X and one Y✓
- The female always provides X in the egg✓
- If an egg cell is fertilized by an X bearing sperm✓ a female/girl✓is formed
- If an egg is fertilized by a Y bearing sperm✓
- a male/boy✓ is formed **(5)**

2.7 2.7.1 (a) Female without haemophilia✓ (1)

(b) X^HX^h✓ (1)

2.7.2 - Females have two X chromosomes✓
- Females must inherit two copies of the recessive allele, X^h✓ to be haemophiliac
-Females who inherit only one of the recessive allele X^h, X^HX^h are still not haemophiliac✓ (3)
(Any 3)

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2.7.3

P1 Phenotype Male without haemophilia x Haemophiliac female✓

Genotype $X^HY \times X^hX^h$✓

Meiosis

G/gametes $X^H, Y \times X^h, X^h$✓

Fertilisation

F1/F3 Genotype $X^HX^h, X^HX^h, X^hY, X^hY$ ✓

Phenotype **2 unaffected daughters : 2 haemophiliac sons** ✓

***50%✓ chance of having a haemophiliac son but 100% if it is a son**

P_1 and F_1✓

Meiosis and fertilisation✓

***1 compulsory** +any 6

OR

P1 Phenotype Male without haemophilia x Haemophiliac female✓

Genotype $X^HY \times X^hX^h$✓

Meiosis

Fertilisation

Gametes	X^h	X^h
X^H	X^HX^h	X^HX^h
Y	X^hY	X^hY

1 mark for correct gametes
1 mark for correct genotypes

F1 Phenotype **2 unaffected daughters : 2 haemophiliac sons** ✓

*50%✓ chance of having a haemophiliac son but 100% if it is a son

P_1 and F_1✓

Meiosis and fertilisation✓ ***1 compulsory**+any 6

(7)

(12)

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QUESTION 3

3.1 3.1.1 Naturally resistant means that due to natural genetic variation, some pathogens already have traits✓ that allow them to survive exposure to drugs or pesticides without needing to develop resistance later. (1)

3.1.2 When drugs or pesticides are used, they kill non-resistant pathogens✓, leaving only the naturally resistant ones. According to Darwin's principle of natural selection, individual with resistant alleles will survive✓, reproduce✓ and pass on the allele for resistance trait to their offspring✓, gradually leading to a better-adapted population✓. (3)

(Mark any three)

(4)

3.2 3.2.1 A possible conclusion from this investigation is that chickens bred for meat production gain weight significantly faster than those bred for egg-laying.✓✓ (2)

OR

Chickens bred for meat production are heavier than those bred for egg-laying.✓✓

3.2.2 (a) Age/type of chickens✓ (1)
(b) Live weight✓ (1)

3.2.3 Use the same scale to weigh the chicks✓
-Weigh the same chicks at the same time✓
-Give the chicks same type of food✓
-Same amount of food✓
-Same feeding time✓
-Same age of chicks✓
-Same cages of the same size✓
-Same number of chicks in each sample group✓
(Mark first one only) (1)

3.2.4 $\left(\frac{2500-500}{500}\right) \text{x } 100$✓ $= 400\%$✓ (2)

3.2.5 Increase the reliability of the investigation✓✓ (2)

(9)

3.3 3.3.1 (a) No evolutionary change takes place in phase A ✓ – the species is in equilibrium with its environment ✓ (2)
(b) Phase B points to an accelerated evolutionary change ✓ due to rapid environmental changes ✓ (2)

3.3.2 Punctuated equilibrium ✓ (1)

3.3.3 During phase B, species with favourable characteristics/ suitable to the new environment, survive and reproduce✓ species that do not have advantageous characteristics die out. Thus the chances of speciation during phase B are much greater than during phase A ✓ (2)

(7)

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3.4	3.4.1	A transitional fossil shows intermediate characteristics of two distinct species✓✓		(2)
	3.4.2	- The foramen magnum is located more forward position✓, so that - the vertebral column extends beneath✓ the skull. - The spine is S-shaped ✓to - support an upright posture✓ - The pelvis is shorter and wider✓ - to support the body above✓the pelvis		(6)
	3.4.3	- There was a change in diet✓ - from tough✓/raw to - softer✓/cooked food		(3) **(11)**
3.5	3.5.1	B✓		(1)
	3.5.2	Taung Child✓ Little foot✓ Mrs Ples✓ Karabo✓	**(Any 2)**	(2)
	3.5.3	Site 4✓		(1)
	3.5.4	Mitochondrial DNA✓/mtDNA/genetic evidence✓		(2) **(6)**
3.6	3.6.1	Similar organisms✓ that can interbreed✓ to produce fertile offspring✓		(3)

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NSC

3.6.2 The process of speciation*✓ through a geographical isolation

If a population of a single species becomes separated by a separated by a geographical barrier✓ (central valley)

Then the population splits into two✓, there is no gene flow between the two populations✓

Since each population may be exposed to different environmental conditions✓/the selection pressure may be different

Natural selection occurs independently in each of the two populations✓, such that the individual of the two populations become different from each other✓

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Genotypically and phenotypically✓

Even if the two populations were to mix again✓, they will not be able to interbreed✓

The two populations are now different species (6)

(Any 5 + 1 compulsory*)

3.6.3 Natural selection causes individuals with advantageous traits to survive and reproduce ✓

Over time, isolated populations adapt to different environments ✓

This leads to the development of distinct traits ✓

Eventually, reproductive isolation results in speciation ✓

DO NOT CREDIT: THE QUESTION HAS BEEN REMOVED DUE TO TYPING ERROR AND CONVERSION TABLE PROVIDED

(4)
(13)

TOTAL SECTION B: 96
GRAND TOTAL: 146