education

MPUMALANGA PROVINCE
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

LIFE SCIENCES P2

SEPTEMBER 2024

MEMO

MARKS: 150

These marking guidelines consist of 12 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 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 annotation 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 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 is accepted at the provincial memo discussion meeting

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

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

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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 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.

19. **Changes**
    No changes must be made to the marking guidelines without consulting the Provincial Internal Moderator.

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SECTION A

QUESTION 1

1.1	1.1.1	C✓✓		
	1.1.2	D✓✓		
	1.1.3	B✓✓		
	1.1.4	B✓✓		
	1.1.5	C✓✓		
	1.1.6	C✓✓		
	1.1.7	A✓✓		
	1.1.8	C✓✓		
	1.1.9	B✓✓		
	1.1.10	D✓✓	(10 x 2)	**(20)**
1.2	1.2.1	Nucleotide✓		
	1.2.2	Template✓		
	1.2.3	Haploid✓/gamete		
	1.2.4	Chromatid✓		
	1.2.5	Incomplete✓/partial dominance		
	1.2.6	Biotechnology✓		
	1.2.7	Dihybrid✓cross		
	1.2.8	Biological evolution✓		
	1.2.9	Prognathism✓	(9 x 1)	**(9)**
1.3	1.3.1	None✓✓		
	1.3.2	A only✓✓		
	1.3.3	B only✓✓		
	1.3.4	Both A and B✓✓	(4 x 2)	**(8)**
1.4	1.4.1	Hominidae✓		(1)
	1.4.2	Neanderthals✓		(1)
	1.4.3	5.5 (Accept 5.4 – 5.6) mya✓		(1)
	1.4.4	Handy man✓		(1)
	1.4.5	-Homo✓ -Paranthropus✓ -Australopithecus✓ - Gorilla✓ - Chimpanzee✓ **(Mark first THREE only)**	Any	(3) **(7)**

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1.5	1.5.1	3✓/Three	(1)
	1.5.2	Female chicken with rapid feather production✓	(1)
	1.5.3	(a) $X^B X^B$✓ or $X^B X^b$ (b) X^bY✓	(1) (1)
	1.5.4	X^BY $X^b X^b$ ✓✓	(2) **(6)**

TOTAL SECTION A **[50]**

SECTION B

QUESTION 2

2.1	2.1.1	Body cells✓/ (diploid) cells in the body except the sex cells/gametes		(1)
	2.1.2	(a) 13✓/Thirteen (b) 46✓		
	2.1.3	Corn✓		
	2.1.4	Pollen sac✓/anther/antheridium		
	2.1.5	Anaphase I✓* - Spindle fibres shorten✓/contract - chromosome pairs/ homologous chromosomes separate✓ and - chromosomes move to opposite poles✓		(4)
	2.1.6	- An ovum is a gamete✓ - formed by meiosis✓ - and must be haploid✓ - to overcome the doubling effect of fertilization✓		(4)
	2.1.7	- To reduce the chromosome number✓ - to overcome the doubling effect of fertilization✓ - To form haploid gametes✓ - for sexual reproduction✓ - For random arrangement of chromosomes at the equator and crossing over✓ - to introduce genetic variation to the gametes✓ **(Mark first ONE only)**	Any	(2) **(15)**
2.2	2.2.1	(a) Protein synthesis✓ (b) Nuclear membrane✓ (c) Deoxyribose✓ sugar		(1) (1) (1)
	2.2.2	Anticodon✓		(1)
	2.2.3	- Each tRNA carries a specific amino acid✓ - when the anticodon on tRNA✓ - matches the codon on mRNA✓ - then the tRNA brings the required amino acid to the ribosomes✓		(4) **(8)**

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2.3 2.3.1 Alanine ⟶ Glycine ⟶ Proline✓✓ (2)

2.3.2 30✓/Thirty (1)

2.3.3
- Gene✓* mutation
- is a change in the sequence of nitrogenous bases✓/nucleotides in mRNA. (2)

2.3.4
- The nitrogenous bases(codon) GCA change to GGA✓/GGG
- The anticodon/tRNA sequence changed✓
- The amino acid alanine✓
- was replaced by glycine✓
- This resulted in a different protein✓/no protein being formed

Any (4)
(9)

2.4 2.4.1 2✓/ Two (1)

2.4.2 I^A, I^B, i ✓✓ (2)

2.4.3
- I^A and I^B are both equally dominant/ Co-Dominant ✓
- they are both expressed in the phenotype equally✓
- as AB blood group✓
- I^A and I^B are dominant over i✓/complete dominance
- When either I^A or I^B occurs with i, only the dominant allele will be expressed in the phenotype✓
- as either A or B blood group✓
- i is recessive✓
- a person must have 2 recessive alleles✓/ ii
- to have blood group O✓

Any (5)
(8)

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2.5	2.5.1	DNA Profiling✓	(1)
	2.5.2	Blood✓/ Saliva/ cheek cells/ hair with follicle **(Mark first ONE only)** Any other applicable example	(1)
	2.5.3	(Mr & Mrs) Ntsingila✓✓	(2)
	2.5.4	3✓✓/Three	(2)
	2.5.5	- All/100% of the DNA bars/lines/stripes of baby 3✓ - Match with both Mr and Mrs Gumede (DNA) bars/lines/stripes✓ OR - 50%/2 of the DNA bars/lines/stripes from baby 3 matches with Mr Gumede✓ - and 50%/2/the rest the DNA bars/lines/stripes from baby 3 matches with Mrs Gumede✓	(2)
	2.5.6	- Crime investigations✓/ matching suspects to crime scene evidence - Finding long lost relatives✓ - Identifying dead bodies✓ - Identifying fossils✓ - Diagnosing genetic disorders✓/ genetic counselling - Finding tissue matches for organ transplants✓ **(Mark first TWO only)** Any	(2) **(10)**
			[50]

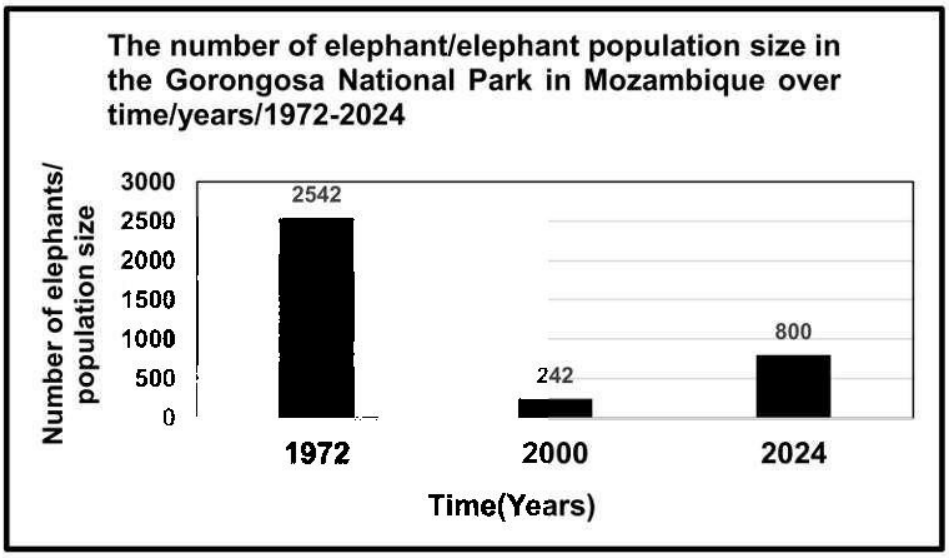
QUESTION 3

3.1 3.1.1

$$\frac{2542 - 242}{2542} \checkmark \times 100 \checkmark = 90\% \checkmark \text{(accept 90.4 - 90.48)}$$

(3)

3.1.2



Description	Mark allocation
Heading **(H)**	1
Type of graph **(T)**	1
Correct labelling of X and Y-Axis (**L**)	1
Correct scaling of X and Y- Axis **(S)**	1
Plotting **(P)**	1 – 1- 2 bars drawn correctly 2 – all 3 bars drawn correctly

If wrong type of graph is drawn, loose marks for type of graph (T)
If axis are swopped, loose marks for labels and scale(L & S)

(6)

3.1.3 Harmful✓/ Lethal mutation (1)

3.1.4 Genetic✓
Modification by descent✓/ homologous structures (2)

3.1.5
- Because the mutation is caused by a dominant allele
- Only one dominant allele is needed to be expressed in the phenotype✓/for an elephant to be tuskless
- If the female gives (a X chromosome carrying) a dominant allele and the male gives a X chromosome (carrying a recessive allele), the female offspring will be tuskless✓
- If the female gives (a X chromosome carrying) a recessive allele and the male gives a X chromosome (carrying a recessive allele), the female offspring will have tusks✓
- If the female gives (a X chromosome carrying) a recessive allele and the male gives a Y chromosome, the male offspring will have tusks✓
- If the female gives (a X chromosome carrying) a dominant allele and the male a Y chromosome, the male offspring will not be born✓/miscarried/ die (5)

3.1.6 Punctuated equilibrium✓ (1)

3.1.7
- There was a great deal of variation among the African elephants in the Gorongosa National Park✓
- Some elephants had tusks while others did not✓
- The elephants with tusks were **poached✓***
- and died✓
- The elephants without tusks survived✓
- And reproduced✓
- The allele for not having tusks was passed to their offspring✓
- In future generations there will be a higher proportion of **female** elephants without tusks✓ 1 Compulsory ✓* + Any SIX (7)

3.1.8
- The elephant population will decline✓
- Since there will be a shortage of males for mating✓
- Due to the males being miscarried✓ (3)

(28)

3.2

- A population of a single species becomes separated by a geographical barrier (sea, river, mountain, lake) ✓
- then the population splits into two groups.✓
- There is now no gene flow between the two populations/groups.✓
- 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 individuals of the two populations become very different✓ from each other
- 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. ✓ Any **(7)**

3.3 3.3.1

- Being able to make/control/ use fire to cook is a higher order/advanced skill✓
- Indicating a better/ bigger/ more advanced brain✓ (2)

3.3.2

- Softer/cooked food required less bite force✓/ less muscles/ weaker muscles/weaker jaws
- Therefore, less need for prominent brow ridges✓/ no prominent brow ridge /no cranial ridge

- Cooked food is easier to chew✓/bite
- Leading to smaller teeth✓/smaller canines/ jaws became smaller

- Because cooked food is normally not killed using teeth✓
- Palate shape changed to more rounded✓/C shape (3x2) (6)

(8)

3.4	3.4.1	Out of Africa hypothesis✓		(1)
	3.4.2	Fossil✓ Genetics✓		(2)
	3.4.3	Cradle of human kind✓		(1)
	3.4.4	Australopithecus✓		(1)
	3.4.5	Karabo✓ Little foot✓ Taung child✓ Naledi✓ **(Mark first TWO only)**	Any	(2) **(7)** **[50]**
			TOTAL SECTION B:	**100**
			GRAND TOTAL:	**150**

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