NATIONAL
SENIOR CERTIFICATE

GRADE 12

LIFE SCIENCES P2

SEPTEMBER 2024

MEMO

MARKS: 150

These marking guidelines consist of 12 pages.

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

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.

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)

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 $X^B X^b$ (1)
   (b) $X^b Y$✓

    (1)

 1.5.4 $X^B Y$
   $X^b X^b$ } ✓✓   (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✓   (1)
               (b) Nuclear membrane✓   (1)
               (c) Deoxyribose✓ sugar   (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)

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)

2.5   2.5.1   DNA Profiling✓   (1)
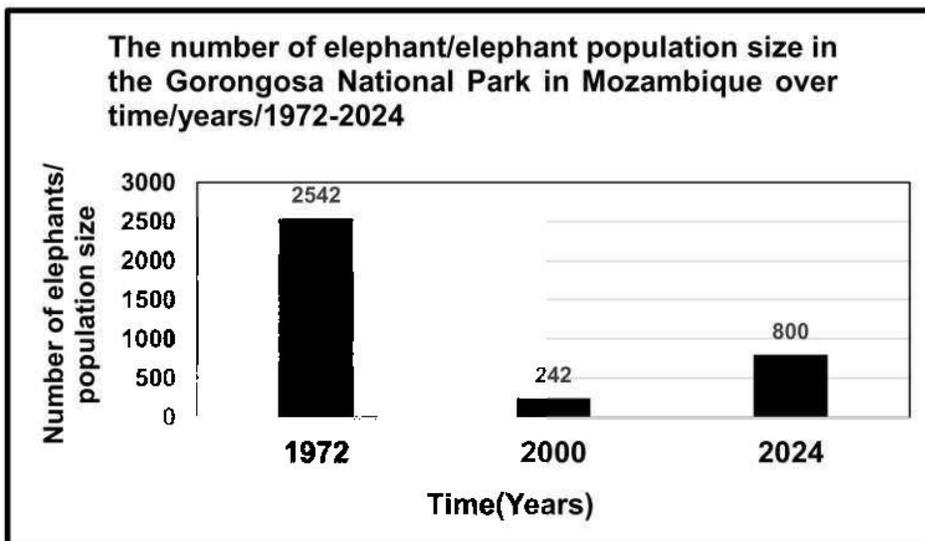
      2.5.2   Blood✓/ Saliva/ cheek cells/ hair with follicle
              (Mark first ONE only)   Any other applicable example   (1)

      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

The number of elephant/elephant population size in the Gorongosa National Park in Mozambique over time/years/1972-2024

Number of elephants/population size (Y-axis: 0, 500, 1000, 1500, 2000, 2500, 3000)

- 1972: 2542
- 2000: 242
- 2024: 800

Time(Years)

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**

SA EXAM
PAPERS