LIMPOPO

PROVINCIAL GOVERNMENT

REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF

EDUCATION

NATIONAL

SENIOR CERTIFICATE

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GRADE 12

LIFE SCIENCES

JUNE EXAMINATION 2025

MARKING GUIDELINES

This marking guideline consists of 14 pages including the cover 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 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.

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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. 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 appear(s) in any official language other than the learner's 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 D✓✓

1.1.4 D✓✓

1.1.5 D✓✓

1.1.6 C✓✓

1.1.7 A✓✓

1.1.8 B✓✓

1.1.9 C✓✓

1.1.10 C✓✓





(10 x 2) (20)

1.2

1.2.1 Centromere✓

1.2.2 Diabetes mellitus✓

1.2.3 DNA Profiling✓

1.2.4 Acrosome✓

1.2.5 Biotechnology✓

1.2.6 Ovary✓

1.2.7 Mutation✓

1.2.8 Aldosterone✓

1.2.9 Amnion✓

1.2.10 Sympathetic✓nervous system

(10 x 1) (20)

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1.3

1.3.1 B only✓✓

1.3.2 B only✓✓

1.3.3 B only✓✓

(2x3) (6)

1.4

1.4.1 (a) Round window✓ (1)

(b) Hammer✓/malleus (1)

1.4.2 (a) B✓ – Eustachian tube✓ (2)

(b) C✓ - Cochlea✓ (2)

1.4.3 D✓ (1)

(7)

1.5

1.5.1 (a) Vas deferens✓/sperm duct (1)

(b) Urethra✓ (1)

1.5.2 (a) C✓ - testis✓ (2)

(b) A✓ – prostate gland✓ (2)

1.5.3 Testosterone✓ (1)

(7)

TOTAL SECTION A: 50

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SECTION B

QUESTION 2

2.1

2.1.1 (a) Sensory neuron✓ (1)

(b) Interneuron/ Connector neuron✓ (1)

2.1.2 - The person will be able to receive the stimulus✓

- but will not be able to respond to it✓

- because the impulse will not be transmitted to the effector✓ Any two (2)

2.1.3 - The myelin sheaths are damaged✓

- This will cause a slow transmission of impulses✓

- and a slow reaction time✓ Any two (2)

(6)

2.2

2.2.1 (a) Ciliary muscle✓/ciliary body (1)

(b) sclera✓ (1)

2.2.2 Pupillary mechanism✓ (1)

2.2.3 - Good light conditions such as bright light✓ (1)

2.2.4 - Accommodation*✓for near vision

- Ciliary muscles contract✓

- Suspensory ligaments slacken✓

- Tension on the lens decreases✓

- The lens becomes more convex✓

- The refractive power of the lens increases✓

- A clear image is formed on the retina✓. Any (5 + 1 ***compulsory mark**) (6)

(10)

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2.3

2.3.1 55°C✓ (1)

2.3.2 $\frac{12 - 5}{5}$ ✓ x 100✓ = 140%✓ OR $\frac{7}{5}$ ✓ x 100%✓ = 140% (3)

2.3.3 - As the temperature increases the average rate of blood flow to the skin increases✓✓ (2)

2.3.4 - At 0°C/ 10°C✓, less blood flows to the skin✓
- Less oxygen✓/nutrients reach the cells and the cells may die

OR

- At 0°C/ 10°C✓, less blood flows to the skin✓
- More carbon dioxide✓/waste products accumulate in the cells and the cells may die (3)

2.3.5 - As the temperature increases✓ from 25°C to 50°C
- Vasodilation occurs✓
- more blood flows to the skin ✓/5,5 to 19 ml/100ml tissue/min of blood flows to the skin.
- so that more heat✓/sweat is lost (4)

(13)

2.4

2.4.1 (a) Chorion ✓ (1)

(b) Umbilical vein✓ (1)

2.4.2 - Acts as a micro-filter✓/protect against pathogens
- Removes harmful wastes✓
- Produces antibodies✓
- Maintains the endometrium✓/secretes progesterone

(Mark first TWO only) (2)

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2.4.3 - Respiratory system✓
- Digestive system✓
- Excretory system✓ Any two (2)

2.4.4 - The zygote divides by mitosis✓
- to form a (solid) ball of cells✓
- called the morula✓
- which develops into a hollow ball of cells✓
- called the blastula✓/blastocyst
- blastula develops chorionic villi✓ Any four (4)

(10)

2.5

2.5.1 - Size of the needle✓
- Thickness of the thread✓/type of the thread
- Colour of the thread✓
- Time period between attempts✓
- Starting distance between the needle and thread✓
- Light conditions✓

Any two (2)

2.5.2 - It takes less time to thread the needle with both eyes open compared to having one eye✓✓

OR

-It takes more time to thread the needle with only one eye open compared to both eyes open✓✓

OR

-The more attempts undertaken to thread the needle, the less time it takes✓✓ (2)

2.5.3 To increase the reliability✓ of the results (1)

(5)

2.6 When the position of the head changes✓

the maculae are stimulated✓

and converts the stimulus into a nerve impulse✓

which is transmitted via the auditory nerve✓

to the cerebellum to be interpreted✓

from which impulses are sent to the✓

skeletal muscles✓/to restore balance (6)

(6)

TOTAL QUESTION 2: 50



QUESTION 3

3.1

3.1.1 **Translation** *✓

Each tRNA carries a specific amino acid ✓

When the anticodon on the tRNA ✓

matches the codon on the mRNA ✓

then tRNA brings the required amino acid to the ribosome ✓

Amino acids become attached to each other by peptide bonds✓

to form the required protein ✓

(**any 5 + 1 compulsory***✓) (6)

3.1.2 W = Proline ✓ (1)

X = Arginine ✓ (1)

3.1.3 Percentage of Thymine (T): 25%

Percentage of Adenine (A): Since adenine pairs with thymine, there will be an equal percentage of adenine. So, adenine (A) is also 25%✓

Combined Percentage of Adenine (A) and Thymine (T): 25%(T)+25%(A)=50%

Remaining Percentage for Guanine (G) and Cytosine (C): The rest of the DNA molecule must be made up of guanine and cytosine, which together account for 100%−50% = 50% ✓

Percentage of Guanine (G): Since guanine pairs with cytosine, there will be an equal percentage of guanine and cytosine. Therefore, guanine (G) is 50% / 2 = 25%

Cytosine (C) is also 25% ✓

Ratio of Guanine to Adenine: Since both guanine (G) and adenine (A) are present in equal amounts (25%), the ratio of guanine to adenine is:

Ratio of G to A =25% / 25% = 1✓

Therefore, **the ratio of guanine to adenine is 1:1 (*✓any 2 plus compulsory**) (3)

(11)

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3.2.

3.2.1 Due to non-disjunction✓/non - separation of chromosome pair during Anaphase I, two chromosomes moved to one pole✓ and none moved to the other pole ✓ (3)

3.2.2 -Gamete A will have 24 chromosomes ✓/ an extra chromosome
- and when it fertilises a normal ovum ✓/ gamete with 23 chromosomes
- The zygote will have 3 chromosomes at position 21 ✓/ 47 chromosomes (3)

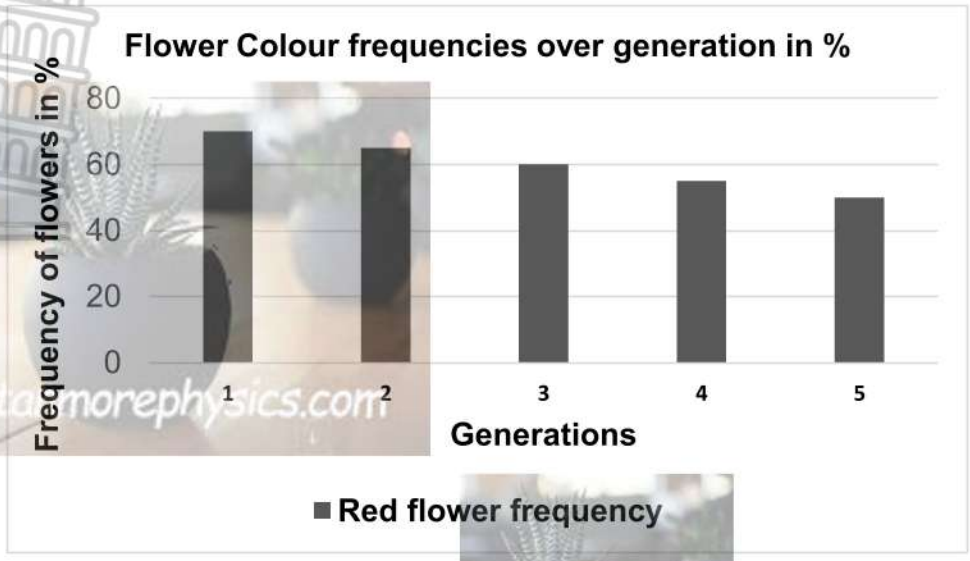
3.2.3 Prophase I ✓ Homologous chromosomes from each parent pair up and non-sister chromatids overlap ✓at the chiasma/chiasmata✓ and exchange the genetic materials (3)

(9)

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3.3

3.3.1



Guideline for marking the graph/Rubric

Correct type of a graph	**(T)**	Bar graph drawn	1
Caption	**(C)**	Both variables included	1
Scale	**(S)**	Correct scale used for Y-axis Equal space and width of bars for X- axis	1
Axes labels	**(L)**	Both X and Y axis labelled correctly with units	1
Plotting of co-ordinates	**(P)**	1 to 3 plotted correctly All 5 co-ordinates plotted correctly	1 2

(6)

3.3.2 a) Generations✓ (1)

b) Frequency of flowers✓ (1)

c) Complete dominance✓ (1)

(9)

3.4

3.4.1 P1 Phenotype: Tall stem and Purple Flower X Tall Stem and Purple flower ✓

Genotypes TtDd x TtDd ✓

Meiosis

Fertilization

	TD	Td	tD	td	✓
TD	TTDD	TTDd	TtDD	TtDd	
Td	TTDd	TTdd	TtDd	Ttdd	✓
Td	TtDD	TtDd	ttDD	ttDd	
Td	TtDd	Ttdd	ttDd	Ttdd	

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Genotypes:

1 TTDD: 2 TTDd: 2 TtPP: 4 TtDd: 1 TTdd: 2 Ttdd: 1 ttDD: 2 ttDd: 1 ttdd

(**compulsory**) *✓

9 Tall stems, purple flowers:

3 Tall stems, white flowers

3 Short stems, purple flowers

1 Short stem, white flowers

P1 and F1 ✓

Meiosis and fertilization ✓

Any 5 plus (**compulsory**) *✓ (6)

3.4.2 Probability Calculation:

Stem Height: Tall (T-), Short (tt).

Flower Color: Purple (D-), White (dd).

Probability of tall stems (T-) and white flowers (dd):

Tall stems: 75% (TT, Tt) ✓

White flowers: 25% (dd) ✓

Combined probability: 75% X 25% = 18.75% ✓

OR

3/16✓ X 100✓ = 18.75✓% (3)

(9)

3.5 .

3.5.1 The father's genotypes could be either I^BI^B ✓or I^Bi. ✓ (2)

3.5.2 Blood type B, Blood type O, Blood type A, Blood type AB ✓✓ (All blood types to be correct for 2 marks) (2)

3.5.3 For the child to have blood type O, the father's genotype must be I^Bi, ✓which allows for the possibility of passing on an i allele✓. The mother, having the I^Ai✓ genotype, pass on an i✓ allele. Thus, when both i alleles come together in the child (ii), they result in blood type O .✓ (5)

3.5.4 Three / 3 ✓ (1)

3.5.5 I^A and I^B ✓ (1)

3.5.6 - Diagnosis of inherited disorders✓

- Developing cures✓

- Tracing criminals✓

- Identifying lost relatives✓

Any one (1)

(12)

TOTAL: 50

GRAND TOTAL: 150

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