GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

PREPARATORY EXAMINATION

2025

MARKING GUIDELINES

LIFE SCIENCES (PAPER 2) (10832)

14 pages

Additional notes to the marking of Life Sciences Prelims P2 2025

- Many of these are concessions, they should not be taught in class.
- Any information in brackets is not compulsory for awarding marks
- Any text that is underlined is compulsory for the answer.

QUESTION 1

1.1. If the candidate gave more than one answer, they will get no marks e.g. 1.1.2 C/D X

1.2. If learners give more than one answer, or provide slash answers, they will lose the mark irrespective if the first option is correct or not. The exception is when the two terms given are different words for the same term e.g. quadraperpedalism/quadrapedal.

1.2.2 Accept quadruped

1.4.1 NOT DNA Profile (that is the collective sequence of bars of a person not the process of comparing the bars).

1.5.6 Genus name's first letter MUST be capitalized, and for the species name all MUST be in lowercase. Do not penalise if the candidate did not underline (this is a concession)

1.6.2 & 1.6.4 b) In place of Widow's peak, accept "hairline is curved, forming a point" (ALL must be included)

1.6.3.a) No mark for spermatogenesis/oogenesis (the question asked for arrow**s** not arrow), Accept spermatogenesis AND oogenesis

1.6.4 a) No mark if there is a significant gap between the letters or a separator

e.g. HH Ff X

HH,Ff X etc.

Also don't accept if the letters are mixed HFHf X

Accept FfHH✓

1.6.4 b) In place of Freckles absent, accept "No/absent tiny brown spots"

QUESTION 2

2.1.2 The second bullet must clearly indicate that it is the two chromatids of different chromosomes that that are overlapping. Alternative wordings include.

- Chromatids of maternal and paternal chromosomes overlap
- Inner chromatids of the chromosomes/homologous pair overlap, etc.

2.2.2 Long molecule, not accepted as long has to be relative to something else, mRNA is also long relative to tRNA etc.

Accept that the two strands run anti parallel

2.2.3. Accept is "the site of translation"

2.4.2 If the learner used Complete dominance and Co-dominance as table column headings, they will get 1 mark for the table and 2 marks for the headings being the first difference.

2.4.3 Accept just A/B/AB when in line with phenotype. Learners must be encouraged to write out blood group A etc. as in a sentence A, can be confusing for markers and learners will not get marks.

At F1 Phenotype, only look for the mention of Group A to award the mark.

QUESTION 3

3.1.5 If the learner refers to males, no marks for those parts, e.g. males have only one X chromosome, etc.

If a learners write, females have 2 XX, that is incorrect as it means 4 X chromosomes

3.3.2 Names of species must be mentioned with the characteristic for the description.

Accept “Temporal isolation” for breeding at different times of the year (Not in the exam guidelines!)

3.3.3 The word **population** is compulsory (if not mentioned, they get no marks). If mentioned once it suffices to give the marks after that. If it is replaced with species, the sentences are incorrect.

3.4.2 (The percentage of patients with TB’s) development of resistance to Isoniazid antibiotic (over the years) *Do not penalise learners for including the aspects in brackets.

PRINCIPLES RELATING TO THE MARKING OF LIFE SCIENCES

1. **If more information than marks allocated is given**
   Stop marking when maximum marks are reached and place a wavy line and 'max' in the right-hand margin.

2. **If, for example, three reasons are required and five are given**
   Mark only the first three irrespective of whether all or some are correct/incorrect.

3. **If the whole process is given when only part of it is required**
   Read all and credit relevant part.

4. **If comparisons are asked for but 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 the sequence is muddled and links do not make sense**
   Where the sequence and links are correct, credit. Where the sequence and links are incorrect, do not credit. If the sequence and links become correct again, resume credit.

9. **Non-recognised abbreviations**
   Accept if first defined in the answer. If not defined, do not credit the unrecognised abbreviation but credit the rest of answer if correct.

10. **Wrong numbering**
    If the 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 memo discussion meeting.

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

15. **If units are not given in measurements**
Candidates will lose marks. Marking guidelines 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.

19. **Changes to the marking guidelines**
No changes must be made to the marking guidelines without consulting the provincial internal moderator.

SECTION A

QUESTION 1

1.1 1.1.1 D ✓✓

1.1.2 C ✓✓

1.1.3 B ✓✓

1.1.4 B ✓✓

1.1.5 B ✓✓

1.1.6 C ✓✓

1.1.7 B ✓✓

1.1.8 D ✓✓

1.1.9 D ✓✓

1.1.10 C ✓✓

(10 x 2) **(20)**

1.2 1.2.1 Phylogenetic tree ✓/Cladogram

1.2.2 Quadrupedalism✓/Quadrupedal

1.2.3 Cranium ✓

1.2.4 Centriole ✓/Centrosome

1.2.5 Haemophilia ✓

1.2.6 Homozygous ✓

1.2.7 Chloroplast ✓

(7 x 1) **(7)**

1.3 1.3.1 B only ✓✓

1.3.2 None ✓✓

1.3.3 A only ✓✓

(3 x 2) **(6)**

1.4	1.4.1	DNA profiling ✓	(1)
	1.4.2	(Child) B ✓	(1)
	1.4.3	B ✓ C ✓ **(Mark first TWO only)**	(2) **(4)**
1.5	1.5.1	(a) B ✓ (b) A ✓	(1) (1)
	1.5.2	Foramen magnum ✓	(1)
	1.5.3	Rectangular ✓/U-shaped	(1)
	1.5.4	B ✓	(1)
	1.5.5	A ✓	(1)
	1.5.6	*Homo sapiens* ✓	(1) **(7)**
1.6	1.6.1	Dihybrid ✓	(1)
	1.6.2	Widow's peak ✓ hairline	(1)
	1.6.3	(a) Gametogenesis✓/meiosis (b) Fertilisation ✓	(1) (1)
	1.6.4	(a) HHFf✓/HhFf (b) Straight hairline and freckles absent ✓	(1) (1) **(6)**

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 2.1.1 (a) Cell membrane ✓ (1)

(b) Centromere ✓ (1)

2.1.2 **Crossing over ✓***

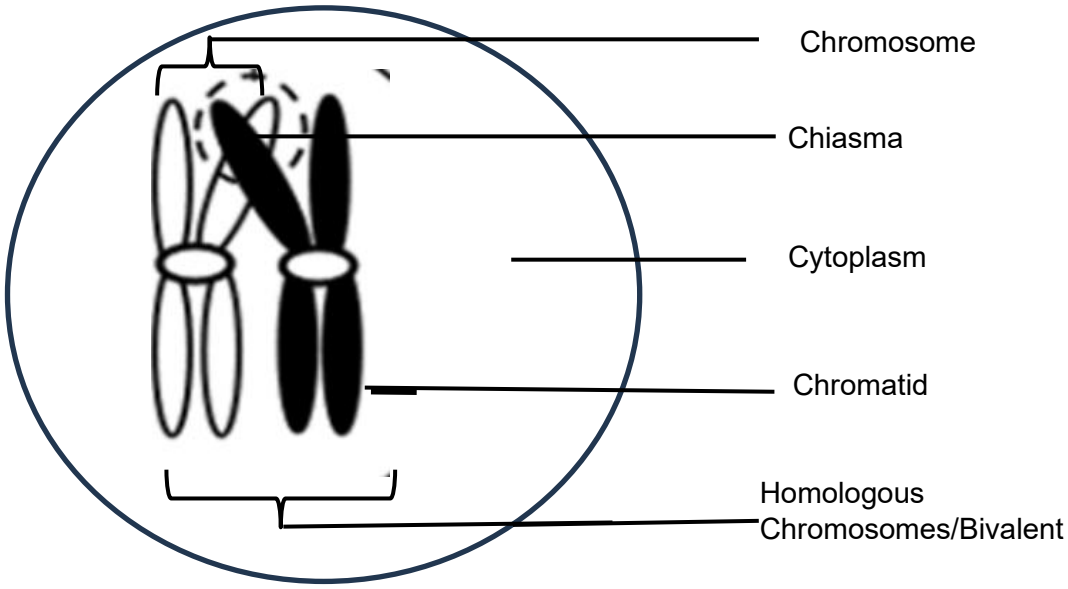
- Homologous chromosomes lie next to each other ✓
- Adjacent/non-sister chromatids of each chromosomes overlap✓.
- at points called chiasmata ✓
- and genetic material is exchanged ✓

1* Compulsory mark + Any 3 (4)

2.1.3
- The gametes that form will be genetically different ✓/introduces genetic variation in gametes
- leading to variation in the offspring ✓/increasing the gene pool.
- It provides variation for natural selection to work on ✓/offspring are better adapted to a particular environment
- The species has a better chance of survival ✓

Any 3 (3)

2.1.4 **Diagram showing (how chromosomes appear during) crossing over (in Cell B)**



Criteria	Description	Marks
Caption **(C)**	Including "crossing over"	1
Correct drawing **(D)**	Drawing showing crossing over at one point ONLY.	1
Shading **(S)**	One chromosome shaded and one chromosome unshaded	1
Labels **(L)**	1 label correct ANY 2 labels correct	1 2

(5)

(14)

2.2 2.2.1 (a) DNA ✓/Deoxyribonucleic acid (1)
(b) mRNA ✓/Messenger RNA (1)

2.2.2
- (Molecule A/DNA) is double-stranded ✓/Nitrogenous bases are held together by weak hydrogen bonds/base pairing occurs/A–T and C–G.
- It has a double helix✓ (shape).
- It is composed of (monomers/smaller molecules called) nucleotides✓.
- It has the nitrogenous bases A, C, G and T ✓, /Has the nitrogenous base Thymine/T.
- (Nucleotides) have deoxyribose sugar ✓
- and a phosphate. ✓/sugar-phosphate backbone

(Mark first THREE only) Any (3)

2.2.3 Site for protein synthesis ✓ (1)

2.2.4
- **Translation *** ✓
- Each tRNA carries a specific amino acid. ✓·
- When the anticodon on the tRNA ✓
- matches the codon on the mRNA ✓
- the tRNA brings the required amino acid to the ribosome. ✓
- Amino acids become attached to each other by peptide bonds ✓
- to form the required protein. ✓

1* Compulsory mark + Any 4 (5)
(11)

2.3 2.3.1
- The mutation caused a change in the sequence of nitrogenous bases in the DNA✓/the DNA base triplet changes.
- This changed the mRNA sequence✓/codon,
- which in turn changed the tRNA sequence ✓/anticodon.
- Hence, the fourth amino acid in Brian's protein is valine. ✓/Brian has two valines in his sequence/Brian has valine in place of proline. (4)

2.3.2 Eighteen ✓/18 (1)

2.3.3 GAC ✓ TGC ✓ (2)
(7)

2.4 2.4.1 45✓% (1)

2.4.2

(**Dominance in) blood group A/complete dominance**	**(Dominance in) blood group AB/Co-dominance**
Complete dominance ✓	Co-dominance ✓
One allele is dominant, and the other is recessive ✓/recessive allele is present in the heterozygous state/ I^A is dominant over i.	Both alleles are equally dominant✓/no recessive allele is present in the heterozygous state /I^A is equally dominant to I^B.
Only the dominant allele is expressed in the phenotype ✓/ recessive allele is masked in the phenotype.	Both alleles are expressed in the phenotype. ✓

(Mark first TWO only) (2 x 2) + (1)(**T**) table with column headings ✓ (5)

2.4.3 **P**$_1$ Phenotype Blood group B X Blood group AB ✓

Genotype I^Bi X I^AI^B ✓

Meiosis

G/Gametes I^B i X I^A I^B ✓

Fertilisation

F$_1$ Genotype I^AI^B I^BI^B I^Ai I^Bi ✓

Phenotype Blood group AB
Blood group B
Blood group A ✓

P$_1$ and **F**$_1$ ✓

Meiosis and fertilisation ✓

OR

P$_1$ Phenotype blood group B X Blood group AB ✓

Genotype I^Bi X I^AI^B ✓

Meiosis

G/Gametes

Fertilisation

	I^B	I
I^A	I^AI^B	I^Ai
I^B	I^BI^B	I^Bi
1 Mark for correct gametes ✓ 1 Mark for correct genotype ✓		

F$_1$ Phenotype Blood group AB
Blood group B
Blood group A ✓

P$_1$ and **F**$_1$ ✓

Meiosis and fertilisation ✓

Any (6)

(12)

2.5 2.5.1 Autosome ✓/autosomal (1)

2.5.2 Undifferentiated/unspecialised cells ✓ that can become into any type of cell/tissue✓ in the body. (2)

2.5.3
- Stem cells with the CCR5-mutation can develop into new white blood cells, ✓
- with a protein that has a different shape, ✓
- therefore, the HI virus cannot attach to the white blood cells ✓
- and cannot infect the white blood cells. ✓ Any (3)

(6)
[50]

QUESTION 3

3.1 3.1.1 - Shawl scrotum✓/scrotum surrounds the penis
- Undescended testes ✓
(Mark the first TWO only) Any (2 x 1) (2)

3.1.2 An allele that is masked in a heterozygous state/by the dominant allele ✓ and, therefore, is not expressed in the phenotype. ✓
OR
An allele that is only expressed in the phenotype ✓ when in a homozygous state. ✓ (2)

3.1.3 3 ✓/Three (1)

3.1.4 (a) Male with AAS ✓ (1)
(b) X^AX^a ✓ (1)

3.1.5
- Females have two X chromosomes ✓/XX.
- If they inherit one X chromosome with the recessive allele (for AAS), they may have another X chromosome that has a dominant allele. ✓/Females can be heterozygous/ $\mathbf{X^A\ X^a}$.
- The dominant allele/$\mathbf{X^A}$ will mask the recessive allele/$\mathbf{X^a}$. ✓/in the heterozygous form they will not have AAS.
- Only if they have two recessive alleles/$\mathbf{X^a\ X^a}$ will they have AAS. ✓ Any (3)

(10)

3.2 3.2.1 - Reduces genetic variation ✓
- It is expensive. ✓
(Mark the first TWO only) (2)

3.2.2
- The nucleus of the ovum is haploid ✓/has half the chromosome number of a dog (the species)/does not have the complete genetic code
- and it does not contain the desired DNA/genetic information of the dog being cloned. ✓/it has the genetic material of another female dog.

OR

- When the nucleus of the skin cells is inserted in the ovum, it creates a diploid cell ✓/cell that has the full chromosome number of a dog
- and has all the desired DNA ✓/genetic information for the dog being cloned only.

OR

- If it was left, the result would be haploid plus diploid ✓/too many chromosomes/triploid.
- Which could be unviable ✓/Cause disorders/could be miscarried/spontaneous abortion. (Any 2 x 2) (4)

(6)

3.3 3.3.1
- Similar organisms ✓/(Organisms) with similar characteristics
- Capable of interbreeding ✓
- Can produce fertile offspring ✓ (3)

3.3.2
- Species-specific courtship behaviour ✓
- *H. ornate males make a strong chorus, while P. adspersus males make a deep, low-pitched whoop.* ✓
- Breeding at different times of the year ✓
- *H. ornate* breeds in summer, while P. *adspersus* breeds in spring. ✓ (4)

3.3.3
- If a **population** of a single species becomes separated by a geographical barrier ✓/example
- then the **population** splits into two. ✓
- There is now 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 individuals of the two **populations** become different, ✓
- genotypically and phenotypically. ✓
- even if the two **populations** were to mix again, ✓
- they will not be able to interbreed. ✓

Any (6)

(13)

3.4 3.4.1 Natural selection ✓ (1)

3.4.2 Development of resistance to Isoniazid antibiotic ✓ (1)

3.4.3. Northern Cape ✓ (1)

3.4.4
- 349 patients (with TB) were selected. ✓
- A survey was repeated in 2013 – 2014. ✓
- The survey was conducted over a period of 2 years. ✓

(Mark the first ONE only) (1)

3.4.5
- All patients had TB. ✓
- All the patients were over 18 years. ✓
- All the patients' medical records were reviewed. ✓
- All patients were from South Africa. ✓
- Development of resistance was seen for the same medication ✓/ Isoniazid/all were treated with the same antibiotic.
- Same duration of the 2 surveys ✓/2 years each

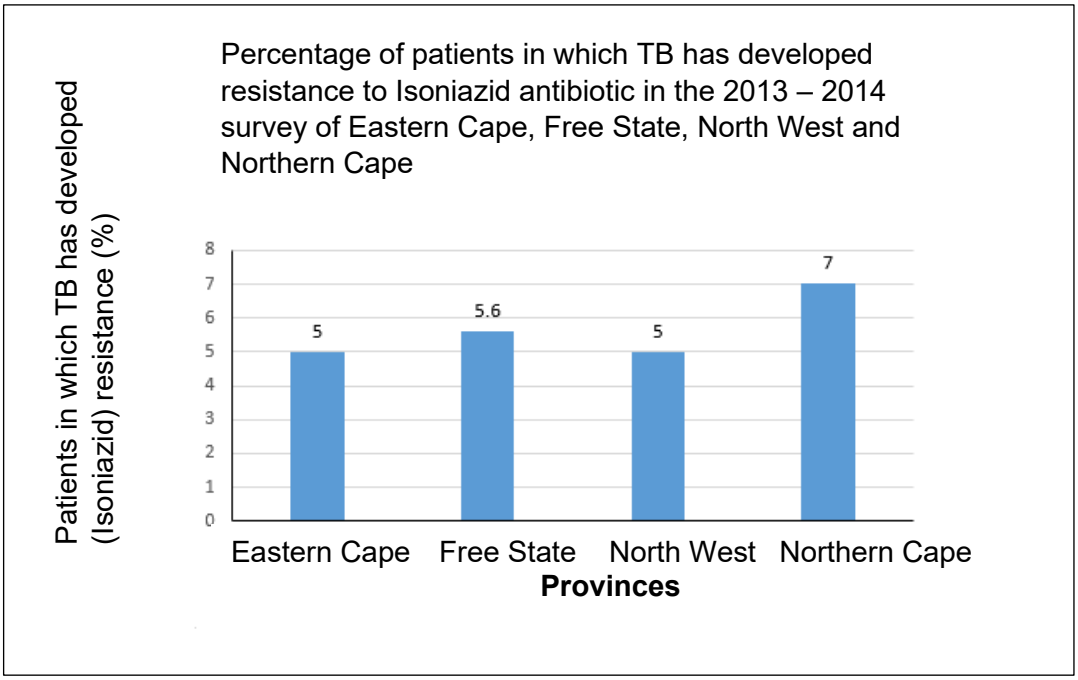
(Mark the first TWO only) (2)

3.4.6 $\frac{5,0 + 5,6 + 4,7 + 4,3 + 4,2 + 6,3 + 5,0 + 7,0 + 6,1}{9}$ ✓ ✓ **OR** $\frac{48,2}{9}$

= 5,36 ✓% (3)

3.4.7 The percentage of patients in which TB has developed resistance to Isoniazid antibiotic has increased over time✓✓ (2)

3.4.8



Rubric for assessment of the graph

Criteria	Elaboration	Symbol	Mark
Type of graph	Bar graph drawn	**T**	1
Caption	Includes TB developed resistance to Isoniazid, years 2013 – 2014 and mention of 4 provinces/Eastern Cape, Free State, North West and Northern Cape	**C**	1
Labels	Correct label of X-axis and Y-axis (including unit %)	**L**	1
Scale	Correct scale for the Y-axis and equal spaces and width of bars on the X-axis	**S**	1
Plotting	1 – 3 co-ordinates correctly plotted ONLY 4 requested co-ordinates correctly plotted	**P**	1 2

- Histogram or line graph drawn - Lose marks for type of graph (**T**) and for scale (**S**)
- Transposed axes: - Can get full credit, if axes labels are also swapped and bars are horizontal - If labels are not corresponding, then lose marks for labels (**L**) and scale (**S**) - Check that the plotting is correct for the given labels (6) **[17]**

3.5 3.5.1 Out of Africa ✓ hypothesis (1)

3.5.2 - Mitochondrial DNA/mtDNA is passed on from mother to child. ✓
- By studying mutations in Mitochondrial DNA ✓/mtDNA,
- the female line of ancestors can be traced. ✓
- It shows that the oldest female ancestor/s of modern humans is/are from Africa. ✓ Any (2)

3.5.3 Fossil ✓ evidence
(Mark the first ONE only) (1)
(4)
[50]

TOTAL SECTION B: 100

TOTAL: 150