education

Department of Education
FREE STATE PROVINCE

PREPARATORY EXAMINATION

GRADE 12

LIFE SCIENCES P2

Stanmorephysics.com

SEPTEMBER 2025

MARKS: 150

MARKING GUIDELINES

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 are 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 the 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 the 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 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 the 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 the 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.

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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. The memorandum will allocate marks for units separately.

16. **Be sensitive to the sense of an answer, which may be stated differently.**

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 applies to all official languages.

19. **Changes to the marking guidelines**
No changes must be made to the memorandum. The provincial internal moderator must be consulted.

SECTION A

QUESTION 1

1.1	1.1.1	B ✓✓	
	1.1.2	B ✓✓	
	1.1.3	A ✓✓	
	1.1.4	B ✓✓	
	1.1.5	A ✓✓	
	1.1.6	C ✓✓	
	1.1.7	B ✓✓	
	1.1.8	C ✓✓	
	1.1.9	A ✓✓	
	1.1.10	C ✓✓	
			(10 x 2) **(20)**

1.2	1.2.1	Sex-linked ✓	
	1.2.2	Theory ✓	
	1.2.3	Monohybrid ✓ cross	
	1.2.4	Interphase ✓	
	1.2.5	Incomplete ✓	
	1.2.6	Telophase 1 ✓	
	1.2.7	(Gene) Mutation ✓	
	1.2.8	Hemophilia ✓	
	1.2.9	Biogeography ✓	
	1.2.10	Darwinism ✓	
			(10 x 1) **(10)**

1.3	1.3.1	BOTH A and B ✓✓	
	1.3.2	A ONLY ✓✓	
	1.3.3	A ONLY ✓✓	
			(3 x 2) **(6)**

1.4	1.4.1	a) Nuclear membrane ✓ / Nucleus	(1)
		b) Polypeptide ✓ / protein	(1)
	1.4.2	a) O ✓	
		b) L ✓	
		c) M ✓	(3)
	1.4.3	TTA ✓✓	(2)
	1.4.4	Leucine, Glutamine (correct order) ✓✓ / Leu, Glu	(2)
			(9)

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1.5	1.5.1	(Robert) Broom ✓	(1)
	1.5.2	*Australopithecus africanus* ✓	(1)
	1.5.3	Taung child ✓ (NOT baby)	(1)
	1.5.4	(Lee) Berger ✓ / Burger	(1)
	1.5.5	*Australopithecus sediba* ✓	(1)
			(5)

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 2.1.1 (Cheek) epithelial ✓ tissue (1)

2.1.2
- DNA- profile bars of victim ✓
- were compared ✓ to
- DNA-profile bars from toothbrush ✓/hairbrush /clothing samples provided by family members
- If ALL the DNA bars /lines /stripes were the same, ✓ the person was identified. (4)

2.1.3 (Victim's) parents ✓ (1)

2.1.4
- The victim will share NO /FEW DNA bars/stripes /lines with their spouse ✓
- ALL the DNA bars /stripes /lines that do not match their mother ✓ will match their father ✓ (3)

2.1.5
- Double stranded ✓
- Helix shaped ✓
- Nucleotides ✓consist out of deoxyribose, ✓ phosphate ✓ and a nitrogen base ✓/ T, C, G and A
- Nitrogen bases pair in complimentary manner ✓/A pairs with T and G pair with C / T=A; G=C
- Nitrogen bases bind with a hydrogen bond ✓ **(any 6)** (6)

(15)

2.2 2.2.1 Metaphase II (1)

2.2.2 It contracts/ shortens ✓ pulling the chromatid ✓/daughter chromosomes toward the (opposite) poles ✓ **(any 2)** (2)

2.2.3
a) 2 ✓ (1)
b) 4 ✓ (1)
c) 4 ✓ (1)

2.2.4
- Single ✓/ Individual chromosomes
- from a single row ✓
- on the equator ✓
- spindle fibres attach to the centromeres ✓ **(any 3)** (3)

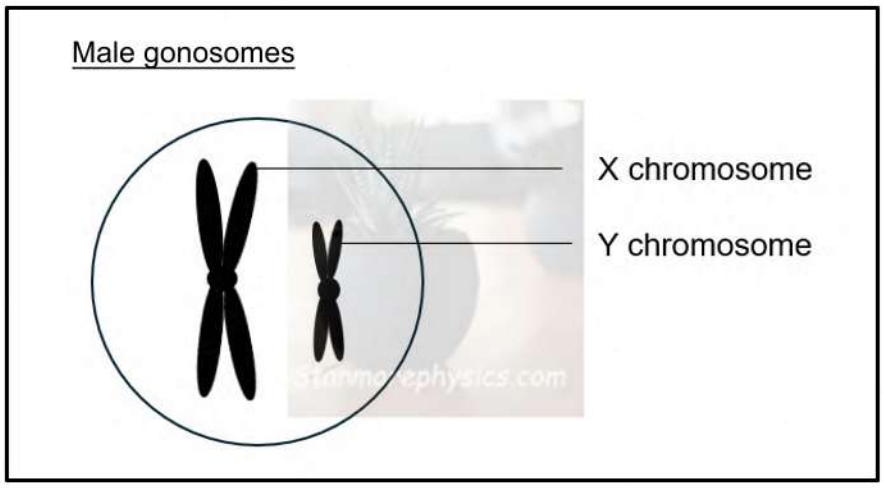
2.2.5
- An organism possesses two 'factors' ✓
- which separate or segregate ✓ during meiosis
- so that each gamete contains only one of these 'factors' ✓ (3)

(12)

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2.3 2.3.1 The father ✓ /male /man (1)

2.3.2



Criteria	Elaboration	Mark
Heading **(H)**	Descriptive heading: refers to male gonosomes	1
Diagram **(D)**	One large X chromosome and one small Y chromosome	1
Labels **(L)**	Any ONE correct label Chromatid, centromere, X-chromosome, Y- chromosome	1

(3)

2.3.3
- (Henry's gametes)/sperm cells have one X-chromosome or one Y-chromosome ✓
- (Ann and Catherine's gametes)/ova have only X-chromosomes ✓
- If an ovum is fertilised by an X bearing sperm, a female/ girl will form ✓
- If an ovum is fertilised by a Y bearing sperm, a boy/male is formed ✓

(4)
(8)

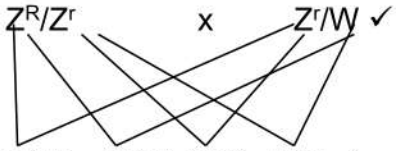
2.4 P_1 Phenotype Red feathered male x Black feathered female ✓

Genotype $Z^R Z^r$ x $Z^r W$ ✓

Meiosis

Gametes Z^R/Z^r x Z^r/W ✓

Fertilisation



F_1 Genotype Z^RZ^r Z^RW Z^rZ^r Z^rW ✓

Phenotype Male with red feathers, male with black feathers, female with red feathers, female with black feathers ✓

1:1:1:1 ✓ *

P_1 and F_1 ✓
Meiosis and fertilisation ✓

***1 compulsory mark** + any 5

OR

P_1 Phenotype Red feathered male x Black feathered female ✓

Genotype $Z^R Z^r$ x $Z^r W$ ✓

Meiosis

Gametes	Z^R	Z^r
Z^r	Z^RZ^r	Z^rZ^r
W	Z^RW	Z^rW

1 mark for correct gametes ✓
1 mark for correct genotypes ✓

Phenotype Male with red feathers, male with black feathers, female with red feathers, female with black feathers ✓

1:1:1:1 ✓ *

P_1 and F_1 ✓
Meiosis and fertilisation ✓

***1 compulsory mark** + any 5 **(6)**

2.5	2.5.1	a) Wrinkled leaves, purple flowers ✓✓	(2)
		b) ddee ✓✓/ eedd (NOT eded)	(2)
		c) (Plant) **B** ✓✓	(2)
	2.5.2	4 ✓/ four	(1)
	2.5.3	25% ✓✓	(2)
			(9)

[50]

QUESTION 3

3.1 3.1.1 Cloning ✓ (1)

3.1.2 Desired characteristics ✓ / genes / genetic material
Of somatic cell ✓/ diploid chromosome count / 2n (2)

3.1.3
- The diploid nuclei were removed from the ear cell ✓,
- The receiver cells were egg cells/ova from domestic goats ✓
- Nuclei of ova were removed ✓
- The diploid nuclei of the Bucardo /Celia were ✓
- transferred into the ova of the domestic goats ✓
- The ova were stimulated to divide through mitosis ✓
- Zygotes developed into embryos ✓
- Embryos were implanted into surrogate goats ✓ **(any 6)** (6)

3.1.4 They took the 7 embryos that resulted in pregnancies ✓
Divide the number of implanted embryos ✓/ 57
Multiply by 100 ✓
(No marks for a mathematical calculation. The question is DESCRIBE.) (3)
(12)

3.2 3.2.1 Phylogenetic tree ✓ /cladogram (1)

3.2.2 4 ✓ (1)

3.2.3 a) *Ardipithecus ramidus* ✓ (1)
b) *Paranthropus robustus* ✓ (1)

3.2.4
- Cultural ✓
- Genetic ✓
- Fossil ✓ **(any 2)** (2)

3.2.5 *Homo habilis* ✓ (1)

3.2.6 *Homo habilis* was found in Africa ONLY ✓
OLDEST fossils of *Homo erectus* and *Homo sapiens* found in Africa ✓
YOUNGER *Homo* fossils found in other parts of the world ✓ (3)

3.2.7
- More forward position of the foramen magnum ✓ – develop ability to walk on two feet ✓ /bipedalism
- Larger cranium ✓ /more rounded cranium – increase in brain size ✓ /more intelligent

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- Flatter face ✓/less sloping forehead /non-prognathous /more develop chin / smaller canines / no diastema / prominent brow ridge – due to softer food ✓/smaller muscles for chewing
- Well developed chin ✓ - development of speech ✓
- S-shaped spine ✓ - absorb shock ✓when walking on two legs
- Pelvis is short and wide ✓ - to carry the weight ✓ of the upper body when walking on two legs (6)

3.3 3.3.1 Type of inheritance ✓ (1)

3.3.2 Same breed of dog ✓/ Dobermans were used ✓
Sample of 5 ml of blood was used ✓ (2)

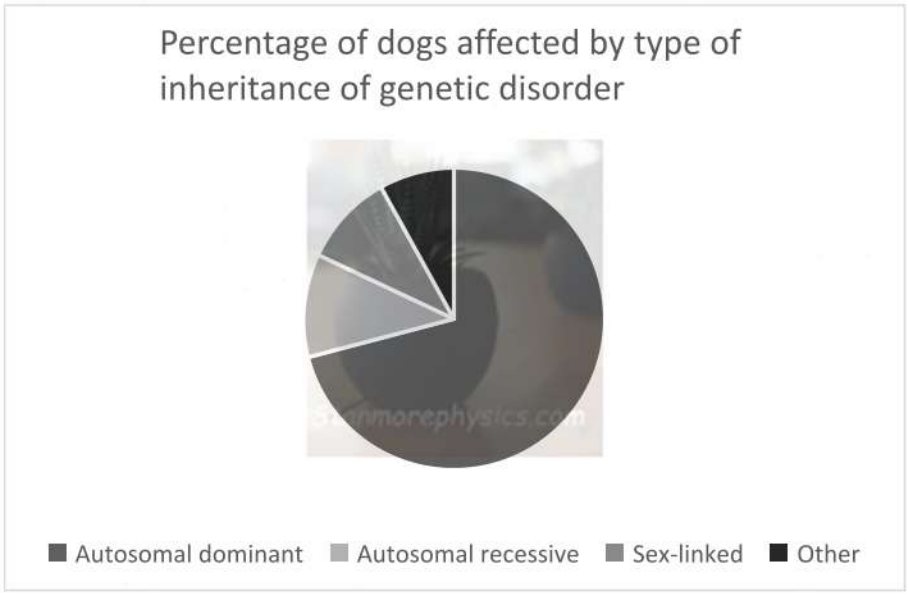
3.3.3 Genetic disorders are not affected by age ✓
Genetic disorders are inherited ✓/ born with the condition
Will be affected for their whole life ✓ **(any 2)** (2)

3.3.4 The allele for the genetic disorder will mask the effect of the allele without the disorder ✓
There are 76 autosomes ✓ on which the autosomal genetic disorder can occur
There are only 2 gonosomes ✓on which the sex-linked genetic disorder can occur

OR

The allele for the genetic disorder will mask the effect of the allele without the disorder ✓
Autosomal: 76/78 x 100 = 97%
Sex-linked: 2/78 x 100 = 2,5% (3)

3.3.5 71/100 x 360° = 255,6
11/100 x 360° = 39,6
10/100 x 360° = 36
8/100 x 360° = 28,8



(6)
(14)

Rubric for marking graph

Criteria	Elaboration	Marks
Type **(T)**	Pie graph	1
Heading **(H)**	Both variables included	1
Calculations **(C)**	One to three segments were correctly calculated All four segments were correctly calculated	1 2
Plotting **(P)** **(Don't measure, judge at a glance)**	One to three segments correctly plotted and labelled All four segments correctly plotted and labelled	1 2

3.4.1 There was variation in the production of amylase in the grey wolf specie ✓
Some grey wolves had the genes to produce amylase, and others did not have these genes ✓
When wolves started to scavenge human food ✓ /when competition occurred
The animals with the ability to digest starch survived and reproduced ✓
And the animals without the ability to digest starch died ✓
The allele to produce amylase was passed on to the offspring ✓
A greater proportion of the wolves/dogs in the next generation had the ability to digest starch (6)

3.4.2 All dog breeds are genetically similar ✓

Can reproduce and produce fertile offspring ✓ (2)

(8)
[50]

TOTAL SECTION B: 100
GRAND TOTAL: 150

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