

education

Department of
Education
FREE STATE PROVINCE

PREPARATORY EXAMINATION

GRADE 12

LIFE SCIENCES P2



These marking guidelines consist of 11 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 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.

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.

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

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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 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 memorandum**
No changes must be made to the memoranda. The Provincial Internal Moderator must be consulted.



SECTION A

QUESTION 1

1.1	1.1.1	B ✓✓		
	1.1.2	C ✓✓		
	1.1.3	C ✓✓		
	1.1.4	A ✓✓		
	1.1.5	D ✓✓		
	1.1.6	A ✓✓		
	1.1.7	A ✓✓		
	1.1.8	D ✓✓		
	1.1.9	C ✓✓		
	1.1.10	C ✓✓	(10 x 2)	**(20)**
1.2	1.2.1	Gene ✓		
	1.2.2	Gametogenesis ✓		
	1.2.3	Phylogenetic ✓ tree		
	1.2.4	Dominant ✓		
	1.2.5	Biogeography ✓		
	1.2.6	Species ✓		
	1.2.7	Opposable thumb✓		
	1.2.8	Theory ✓		
	1.2.9	Non-disjunction ✓		
	1.2.10	Incomplete ✓ dominance	(10 x 1)	**(10)**
1.3	1.3.1	Both A and B ✓✓		
	1.3.2	A only ✓✓		
	1.3.3	Both A and B ✓✓	(3 x 2)	**(6)**
1.4	1.4.1	Dihybrid cross ✓		(1)
	1.4.2	(a) bbnn ✓✓		(2)
		(b) Bitter ✓		(1)
		(c) BN Bn bN bn ✓✓		(2)
	1.4.3	bbNn is sweet with yellow spots ✓ Bbnn is bitter with no yellow spots ✓		(2) **(8)**
1.5.	1.5.1	(a) mRNA ✓		(1)
		(b) Peptide bond ✓		(1)
		(c) GAG ✓✓		(2)
	1.5.2	Ribosome ✓		(1)
	1.5.3	Uracil ✓		(1) **(6)**

TOTAL SECTION A: 50

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SECTION B

QUESTION 2

2.1 2.1.1 GTA ✓✓ (2)

2.1.2 Cysteine ✓ and Threonine ✓ (2)

2.1.3 **The process is translation** ✓*
The codon **UAU** ✓of mRNA
was exposed on the ribosome ✓
The tRNA with the complementary anticodon **AUA** ✓
brought the amino acid **tyrosine** ✓
from the cytoplasm to the ribosome ✓
It was then bonded to the neighbouring/previous amino acid by a peptide bond ✓
(✓* compulsory mark + any 4) (5)
(9)

Credit compulsory mark and any 4 points in sequence
NB. No credit for generic description of translation process if it does not relate to amino acid 11 in the table.

2.2 Structural difference between DNA and RNA



DNA	RNA
Deoxyribose sugar ✓	Ribose sugar ✓
Nitrogenous base Thymine ✓	Nitrogenous base Uracil ✓
Double stranded ✓	Single stranded ✓
Helix structure✓	Straight molecule✓

1 mark ✓ for table and any 2 x 2 **(5)**

Mark first TWO only

2.3 2.3.1 A diploid body cell ✓✓ (2)

2.3.2 It is a haploid cell ✓/Does not have the desired characteristic (1)

2.3.3
- The diploid ✓ embryonic cell removed from an embryo of sheep V
- multiplied by mitosis ✓
- Producing identical cells ✓
- The identical nuclei of the cells were removed and implanted into empty ova ✓
- which developed into genetically identical embryos ✓ /lambs

Any 4 (4)

2.3.4 The nucleus/genetic material originated from sheep V ✓/ the genetic material of sheep W was removed from the ova (1)

2.3.5
- Produce superior livestock ✓
- Produce livestock more rapidly ✓
- As market changes, livestock can be bred to respond to market changes and demands ✓

Mark first TWO only Any 2 (2)

2.3.6
- Against ethical/moral believes ✓
- It is not safe don't know what can happen to clone ✓/ unsure of long- term effects
- Against nature ✓
- Potential health impact✓
- Expensive ✓ (1)
- Reduce genetic variation ✓ **(11)**

Mark first TWO only Any 1

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2.4 2.4.1
- There are 3 different alleles ✓ that determines blood groups
- An individual only inherit two alleles. ✓ (2)

2.4.2 I^Ai ✓✓ (2)

2.4.3
- The baby's genotype is ii ✓/homozygous for the recessive allele
- The baby must inherit one allele for type O blood/i from each parent ✓
- The father/Mr Wilson's genotype is AB and does not have the recessive/ i allele ✓ (3)

2.4.4
- Compare the DNA profiles of the daughter, mother and father ✓
- Identify the DNA bands of the daughter that are the same as that of the mother ✓
- All ✓ the remaining bands of the daughter must be the same as that of Mr Wilson ✓/the father (4)

(11)

2.5
- Males have one X – chromosome and one Y - chromosome on the gonosome✓/ 23 chromosome pair
- Females have two X- chromoomes on the gonosomes ✓ / 23 chromosome pair
- All ova have an X- chromosome from the gonosome ✓
- If an ovum is fertilized by an X-chromosome bearing sperm a female/girl is formed ✓ **(4)**
- If an ovum is fertilized by a Y-chromosome bearing sperm a male/boy is formed ✓ Any 4

2.6 2.6.1
- The population of a single species of squirrels becomes separated by a geographical barrier, (**the river)** ✓*
- The population split into two populations. ✓
- There was no gene flow between the two populations ✓
- Since each population was exposed to different environmental conditions ✓/the selections pressure was different
- natural selection occured independently ✓ in each of the two populations
- such that the individuals of the two populations became very different ✓ from each other
- genotypically and phenotypically ✓
- Even if the populations are to mix again ✓
- they will not be able to interbreed ✓
- The two populations are now different species

1 Compulsory mark + Any 6 (7)

2.6.2
- Breeding at different times of the year ✓
- Species-specific courtship behaviour ✓
- Plant adaptations to different pollinators ✓
- Infertile offspring ✓
- Prevention of fertilisation ✓

Mark first THREE only Any 3 (3)

(10)

(50)



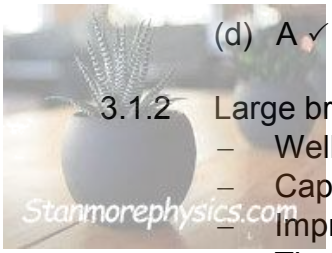
QUESTION 3

3.1 3.1.1 (a) A/B ✓ **(mark first one only)** (1)

(b) C ✓ (1)

(c) C ✓ (1)

(d) A ✓ (1)



3.1.2 Large brain give rise to:
- Well-developed hand-eye coordination ✓
- Capacity of language ✓
- Improved intelligence ✓
- The ability to receive and process more stimuli from the environment ✓
- Better decision making ✓

Mark first TWO only Any 2 (2)

3.1.3
- Smaller cranium size ✓
- Brow ridges are well developed ✓
- Cranial ridges present ✓
- Larger jaws ✓
- Sloping face ✓
- Less developed chin ✓

Mark FIRST THEE only Any 3 (3)

3.1.4 Fossil evidence ✓
Genetic evidence ✓ (2)
(11)

3.2 3.2.1 (a) With OR without artificial selection ✓ (1)

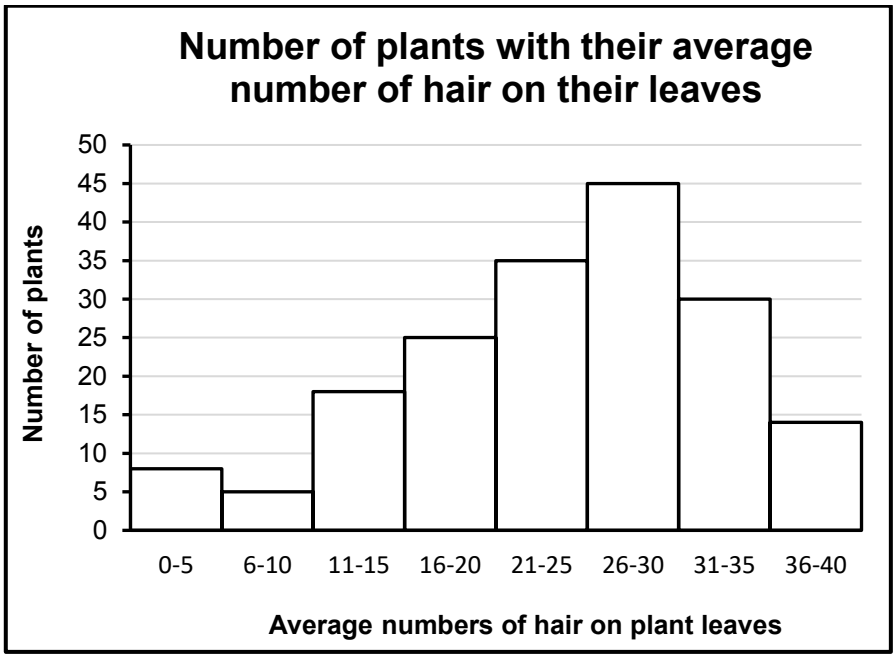
(b) Number of plants with more hairs on their leaves ✓ (1)

3.2.2 Repeat the investigation ✓
Increase the sample size ✓
Mark FIRST ONE only (1)

3.2.3 With artificial selection the number of plants with more hairs on their leaves increases ✓✓ (2)

3.2.4





	Mark Allocation
Correct type of graph (T)	1
Caption for graph with both variables (C)	1
Correct label for X-axis and label for Y-axis (L)	1
Correct scale for X-axis, scale for Y-axis and width of bars (S)	1
Plotting of points (P)	1 (1 to 7points correct) 2 (All 8 points correct)
Note: If the wrong graph is drawn, marks will be lost for 'correct type of graph' and correct scale. If axes are transposed, marks will be lost for labelling of X-axis and Y-axis.	

(6)
(11)

3.3 3.3.1 Prophase II ✓ (1)

3.3.2 (a) B ✓ – chromosome ✓ (2)

(b) E ✓ – centromere ✓ (2)

3.3.3 (a) 4 ✓ (1)

(b) 2 ✓ (1)
(7)

3.4 3.4.1 (a) Unaffected male ✓ (1)

(b) X^dY ✓ (1)

3.4.2 The recessive alleles are only carried on the X chromosome of the gonosome ✓/ 23 chromosome pair (1)

3.4.3

- Colour blindness is carried by a recessive allele ✓
- On the X-chromosome of the gonosome ✓
- Females have two X chromosomes on the gonosome ✓
- Females must inherit two copies of the recessive allele to show the disorder ✓/females who inherit only one of the recessive allele are still normal (4)

3.4.4 **P_1**

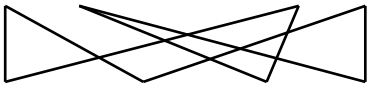
Phenotype : Colour blind female x Unaffected male ✓

Genotype : X^dX^d x X^DY ✓

Meiosis

G/gametes X^d, X^d X^D, Y ✓

Fertilization



F_1 Genotype X^DX^d X^dY X^DX^d X^dY ✓

Phenotype 1 normal daughter :1 colour blind son ✓

50% chance of having a colour blind son ✓*

P_1 and F_1 ✓

Meiosis and fertilization ✓

(✓***Compulsory** 1 + Any 5) (6)

OR



P_1
Phenotype: Colour blind female x Unaffected male ✓
Genotype: X^dX^d x X^DY ✓

Meiosis

Fertilization

Gametes	X^d	X^d
X^D	$X^D X^d$	$X^D X^d$
Y	$X^d Y$	$X^d Y$

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

F_1 Genotype X^DX^d X^dY X^DX^d X^dY

Phenotype 1 normal daughter : 1colour blind son ✓



50% chance of having a colour blind son ✓*

P_1 and F_1 ✓
Meiosis and fertilization ✓ (6)
(✓***Compulsory** 1 + Any 5) **(13)**

3.5 3.5.1
- Predators may mistake it ✓/avoid eating them
- because they resemble A. ochlea which has an unpleasant taste✓ (2)

3.5.2
- There was a variation in the appearance and taste of butterflies √
- The ***Amauris ochlea*** did have an unpleasant taste and the ***Hypolimnas deceptor*** that looks like the ***Amauris ochlea*** did not have an unpleasant taste√
- Predators feed on butterflies in this habitat √
- ***Hypolimnas deceptor*** that look like the ***Amairis ochlea*** with the unpleasante taste were avoided by predetors√ / predators did not prey on them
- they were mistaken by their appearance for unpleasant taste√
- the ***Hypolimnas deceptor*** survive√
- They reproduced and √ (6)
- Passed the alle of apperence/allele of looking similar to ***A. ochle*** to the offsprings√ **(8)**
- More ***H deceptor*** butterflies is in the next generation that look like ***A ochlea***.√ **[50]**



Any 6

TOTAL SECTION B: 100
GRAND TOTAL: 150