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Department of
Education
FREE STATE PROVINCE

GRADE 12

LIFE SCIENCES P2

JUNE 2025

TOTAL: 150

MARKING GUIDELINES

These marking guidelines consist of 10 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.
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 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.



SECTION A**QUESTION 1**

1.1	1.1.1	B ✓✓		
	1.1.2	B ✓✓		
	1.1.3	D ✓✓		
	1.1.4	C ✓✓		
	1.1.5	C ✓✓		
	1.1.6	B ✓✓		
	1.1.7	B ✓✓		
	1.1.8	A ✓✓	(8x2)	(16)
1.2	1.2.1	Interphase ✓		
	1.2.2	Haemophilia ✓		
	1.2.3	DNA profiling ✓		
	1.2.4	Centriole / Centrosome ✓		
	1.2.5	(Weak) hydrogen bonds ✓		
	1.2.6	Homozygous ✓		
	1.2.7	Ribose ✓	(1x7)	(7)
1.3	1.3.1	A only ✓✓		
	1.3.2	None ✓✓		
	1.3.3	B only ✓✓	(3 x 2)	(6)
1.4	1.4.1	a) Y ✓ b) X ✓		(1) (1)
	1.4.2	Double helix ✓		(1)
	1.4.3	A C T G (✓✓)		(2)
	1.4.4	Mitochondria ✓ Chloroplast ✓		(2) (1)
	1.4.5	Thymine ✓ / (T)		(1)
	1.4.6	Four ✓ / 4		(9)



1.5	1.5.1	Dihybrid (crossing) ✓	(1)
	1.5.2	(a) BBhh ✓✓	(2)
		(b) bh ✓ / bh bh bh bh	(1)
		(c) Brown hair colour and short hair ✓✓	(2)
			(6)
1.6	1.6.1	4 / Four ✓	(1)
	1.6.2	2 / Two ✓	(1)
	1.6.3	- They are the same/ similar size/length. ✓ - They have the same/ similar shape. ✓ - They have genes for the same characteristics. ✓ - They have alleles of a specific gene on the same locus. ✓ - They have centromeres in the same position. ✓	(2)
		(Mark first TWO only)	(Any TWO)
			(1)
	1.6.4	Centromere ✓	(1)
	1.6.5	Diploid cell ✓	(6)
TOTAL SECTION A:			(50)

QUESTION 2

2.1.	-It is the arrangement of the (complete set of an individual's)		
1	chromosomes ✓		
	-According to the number and shape ✓ of the chromosomes.		(2)
	Autosomes ✓		(1)
2.1.			
2	Female ✓✓		(2)
2.1.	- 3 chromosomes ✓ / an extra chromosome		
3	- at position number 21 ✓		(2)
			(7)
2.1.			
4	- The factors/alleles that control a characteristic separate ✓ - during meiosis ✓ - so that only one factor/allele is present in each gamete ✓		(3)
2.2			
	Translation ✓		(1)
	Ribosome ✓		(1)
2.3.	a) Peptide Bond ✓		(1)
1	b) tRNA ✓ / transfer RNA		(1)



- 2.3. 3✓/three (1)
2
- a) Tryptophan✓ (1)
- 2.3. 3 b) ACC✓✓ (2)
- c) 2✓ (1)
- 2.3. 4 - The codon on the mRNA✓
- will change from UUA to UUG✓
- 2.3. 5 - The anticodon on the tRNA will bring the same amino acid ✓/
Leucine to the ribosome
- The sequence of the amino acids would not change ✓
- Therefore, there will be no effect on the protein formed✓/ same
protein will form (5)
(14)
- 2.3. 6
- 2.4 - The DNA double helix unwinds✓ and
- (the double strand) unzips/weak hydrogen bonds break✓
- to form two separate strands✓
- One strand is used as a template✓
- To form mRNA✓
- Using free RNA nucleotides✓from the nucleoplasm
- The mRNA is complementary to the DNA ✓/A compliments U,G
compliments C
Any 6 **(6)**
- 2.5. Striped fur✓ (1)
1
- In Breeding pair 1✓
- 2.5. 2 - both parents are spotted fur✓/none of the parents are striped fur
- but striped fur appears in the phenotype of the offspring✓

OR

- In cross 1✓
-The ratio spotted fur to stripe fur is 3:1✓
-The smaller portion represents the recessive alle striped fur ✓ (3)

A gene mutation is a **change in the sequence of nucleotides** in a



2.5. 3 gene/ DNA ✓✓ (2)

Law of dominance ✓ (1)

2.5. 4

P1 Phenotype : Spotted fur x Spotted fur ✓
Genotype Nn x Nn ✓

2.5. 5

Meiosis
G/gametes N, n x N, n ✓
Fertilization
F1 Genotype NN, Nn, Nn, nn ✓

Phenotype ratio: 3 Spotted : 1 striped * ✓

P1 and F1 ✓
Meiosis and fertilization ✓

***Compulsory 1 + Any 5**

OR

P₁ Phenotype Spotted fur x Spotted fur ✓
Genotype Nn x Nn ✓
Meiosis G/gametes N, n x N, n ✓

Fertilisation

Gametes	N	n
N	NN	Nn
n	Nn	nn

1 Mark for correct gametes
1 Mark for correct genotypes

F₁ Genotype NN, Nn, Nn, nn
Phenotype 3 Spotted fur: 1 Striped fur ✓*

P₁ and F₁ ✓
Meiosis and fertilisation ✓

***Compulsory 1 + Any 5**

(6)
(13)



- 2.6.1 2✓ (1)
- 2.6.2 5 - $X^R X^r$ ✓✓ (2)
- 2.6.3 - Males have only one X chromosome✓/ XY sex chromosomes
 - If this chromosome carries the recessive allele✓/ (X^r)
 - the male will suffer from Lesch-Nyhan syndrome ✓
 - Females have two X chromosomes✓/XX and
 - will only suffer from Lesch-Nyhan syndrome when they carry two recessive alleles on both X chromosomes✓/ ($X^r X^r$)
 - A dominant allele on one of the X-chromosomes will mask the effect✓
- Any 4** (4)
(7)

Total Question 2 [50]

QUESTION 3

- 3.1.1 Father B ✓ (1)
- 3.1.2 - All the DNA profile bars/bands of the children that do not match the mother✓, match the DNA profile bars/bands of Father B✓
OR
 - All DNA profile bands of the mother and Father B✓
 - match all the children's DNA profile bands✓ (2)
- 3.1.3 Child 1 and 2✓✓ (2)
- 3.1.4 - Blood groups cannot identify with certainty who is the father ✓/
 blood groups can only eliminate men who are not the father
 - Because many males have the same blood group. ✓
 - Each person's DNA profile is unique. ✓ (3)
- 3.1.5 - To identify organisms/dead people from their remains✓



- To test for the presence of specific alleles✓ for genetic conditions/Identification of genetic disorders
- To establish matching tissues for organ transplants✓
- Identification of suspects in a crime ✓
- Tracing missing persons ✓
- **(Mark first two only)**

Any 2 (2)

- 3.1.6
- Mark the samples clearly✓ to ensure that the samples are not mixed up✓
 - Wear a mask and gloves✓ ,DNA must not get contaminated✓
 - Use new and clean/sterilized apparatus✓ to ensure no contamination from previous tests. ✓
 - Check the access of persons/Only authorized persons may have access✓ so that no one can tamper with the samples.
- (Mark first ONE Only)** (Any 1 x 2) (2)
(12)

3.2.1 Anaphase 1 (1)

3.2.2 - Chromosome of (homologous pair) is being pulled to the opposite poles ✓ (1)

3.2.3 a) Centriole✓ (1)
b) Spindle fiber✓ (1)3.2.4 3✓/three (1)
(5)

3.3

Mitosis	Meiosis
Mitosis occurs in body cells✓	Meiosis occurs in sex cells✓
Both karyokinesis and cytokinesis occurs once.✓	Both karyokinesis and cytokinesis occurs twice.✓
Two daughter cells are formed.✓	Four daughter cell are formed.✓
Daughter cells are genetically identical to one another and to the parent cell✓	Daughter cells are genetically different from each other and from the parent cell✓
Chromosome number remains constant✓	Chromosome number is halved✓
Crossing over does not occur✓	Crossing over occurs✓

(Mark first THREE only)**(Any 3 X 2) ✓ for TABLE****(7)**

- 3.4.1 What is the effect of temperature on the frequency of meiotic recombination in barley plants? ✓✓ (2)
- 3.4.2 a) Temperature ✓ (1)
b) Frequency of meiotic recombination ✓ (1)
- 3.4.3 - Same amount of water ✓
- Same light intensity ✓
- Same barley plant variety ✓
- Same precise method of counting ✓
(Mark first THREE only) (Any 3) (3)
- 3.4.4 - Genetic material is exchanged. ✓ (1)
- 3.4.5 - The production of haploid gametes ✓
- It maintains a constant chromosome number from one generation to the next. ✓
- It increases genetic variation ✓ (any 2) (2)
(Mark first TWO only) (10)
- 3.5.1 Undifferentiated cells that can develop into any other type of cell ✓✓ (2)
- 3.5.2 Mitosis ✓ (1)
- 3.5.3 - It can help to replace and repair damaged cells ✓ after an injury or infection
- Embryonic stem cells can differentiate into any cell type ✓
- Some diseases and disorders can also be treated. ✓ / Leukemia and Parkinsons can be treated
(Mark first TWO only) (Any 2) (2)
- 3.5.4 Bone marrow ✓ / blood / heart / adipose tissue / brain
(Mark first ONE only) (Any 1) (1)
(6)
- 3.6.1 - Blood groups / the gene for blood groups is controlled by three alleles ✓ / I^A , I^B , i
- Each person can only inherit two alleles ✓ / One allele from each parent ✓
- The I^A and I^B allele are dominant ✓
- over the i allele ✓
- The combination $I^A i$ and $I^A I^A$ produce blood group A ✓
- The combination $I^B i$ and $I^B I^B$ produces blood group B ✓
- The combination $I^A I^B$ produces blood group AB ✓
- The combination ii produces blood group O ✓ (6)
- 3.6.2 - The Mother is heterozygous for blood group A ✓ / $I^A i$



- The father is heterozygous for blood group B ✓ / I^Bi
- The child is homozygous for blood group O ✓ / ii (4)
- And receive the recessive allele ✓ / i from each parent (10)

TOTAL SECTION B: [50] 100
GRAND TOTAL: 150

