Western Cape Government
Education
FOR YOU

METRO NORTH EDUCATION DISTRICT

LIFE SCIENCES P2

GRADE 12

MARKING GUIDELINE

COMMON TRIAL EXAMINATION
SEPTEMBER 2024

MARKS: 150

TIME: 2 $^{1}/_{2}$ hours

This exam paper consists of 12 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 part of it is required**
   Read all and credit relevant part.

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

9. **Non-recognised abbreviations**
   Accept if first defined in answer. If not defined, do not credit the unrecognized abbreviation but credit the rest of 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 recognizable accept provided it does not mean something else in Life Sciences or if it is out of context.

13. **If common names given in terminology**
    Accept provided it was accepted at the National memo discussion meeting.

14. **If only letter is asked for and only name is given (and vice versa)**
No 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 appears in any official language other than the learners' assessment language used to the greatest extent in his/her answers should be credited, if it is correct.

SECTION A

QUESTION 1

1.1	1.1.1	C ✓✓		
	1.1.2	D ✓✓		
	1.1.3	C ✓✓		
	1.1.4	A ✓✓		
	1.1.5	B ✓✓		
	1.1.6	C ✓✓		
	1.1.7	D ✓✓		
	1.1.8	B ✓✓		
	1.1.9	C ✓✓	(9x2)	**(18)**
1.2	1.2.1	Species ✓		
	1.2.2	Cloning ✓		
	1.2.3	Extinction ✓		
	1.2.4	Alleles ✓		
	1.2.5	Haploid ✓		
	1.2.6	Foramen magnum ✓		
	1.2.7	Artificial selection ✓/ selective breeding		
	1.2.8	Hominidae ✓	(8x1)	**(8)**
1.3	1.3.1	None ✓✓		
	1.3.2	B only ✓✓		
	1.3.3	A only ✓✓	(3x2)	**(6)**
1.4	1.4.1	Double helix ✓	(1)	
	1.4.2	(a) Deoxyribose ✓	(1)	
		(b) Adenine ✓	(1)	
		(c) Hydrogen ✓ bond	(1)	
	1.4.3	- Thymine (T) is present✓ - double stranded✓/ base pairing **(Mark first ONE only)** Any	(1)	
	1.4.4	- Nucleus ✓ - Mitochondrion ✓ **(Mark first ONE only)** Any	(1) **(6)**	

1.5	1.5.1	(a) Red, round fruit✓✓	(2)
		(b) RrBb✓✓	(2)
	1.5.2	RB; Rb; rB; rb✓✓ **(All 4 gametes must be correct)**	(2)
	1.5.3	1/16 ✓	(1) **(7)**
1.6	1.6.1	Phylogenetic ✓ diagram	(1)
	1.6.2	Five/ 5 ✓	(1)
	1.6.3	1 mya✓	(1)
	1.6.4	*Australopithecus africanus* ✓	(1)
	1.6.5	*Homo neanderthalensis*✓	(1) **(5)**

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 2.1.1 (a) mRNA ✓ (1)
(b) Codon ✓ (1)

2.1.2 - 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✓ Any (3)

2.1.3 2 – Glycine ✓
3 - Methionine✓ (2)

2.1.4 - A mutation occurred✓
- which changed the sequence of nitrogenous bases on DNA✓
- from GTA to GTC✓
- and caused tRNA to bring a different amino acid✓ Any (3)
(10)

2.2

- The (DNA) double helix unwinds and
- unzips / hydrogen bonds break
- to form two separate strands
- Both (DNA) strands serve as templates
- to build a complementary (DNA) strand / A pairs with T and C pairs with G
- using free (DNA) nucleotides from the nucleoplasm
- This results in **two identical (DNA) molecules**✓ Any **(6)**

2.3 2.3.1 (a) Four/4 ✓ (1)
(b) Three/3 ✓ (1)

2.3.2 (a) $X^h Y$ ✓✓ (2)

(b) $X^H X^h$ ✓✓ (2)

(c) $X^H Y$ ✓✓ (2)
(8)

2.4 2.4.1

P_1	Phenotype	White patch of hair	X	White patch of hair	✓
	Genotype	Hh	X	Hh	✓
	Meiosis				
	Gamete	H h		H h	✓
	Fertilisation				
F_1	Genotype	HH Hh Hh		hh	✓
	Phenotype	3 with white patch of hair		:1 without white patch of hair	✓*

Meiosis and fertilisation✓
P_1 and F_1✓

(Any 5 + 1 compulsory*) **(6)**

OR

P_1 Phenotype White patch of x White patch ✓
Genotype Hh x Hh ✓
Meiosis

Gametes	H	h
H	HH	Hh
h	Hh	hh

Fertilisation

Mark for correct gametes✓
Mark for correct genotypes✓
F_1 Phenotype 3 White patch of hair✓: 1 Without white patch of hair✓*
P_1 and F_1 ✓
Meiosis and fertilisation ✓

(Any 5 + 1 compulsory*)

2.5 2.5.1 (a) Centriole ✓ / centrosome (1)
(b) Spindle fibre✓/ spindle thread (1)

2.5.2 Anaphase I✓ (1)

2.5.3 Six/6✓ (1)

2.5.4 - Random arrangement of chromosomes✓
- results in the formation of genetically different cells✓
- This leads to increased genetic variation in a population✓
- which will cause some individuals to have favourable and some unfavourable characteristics✓
- When environmental conditions change✓
- those with favourable characteristics will survive✓
- and those with unfavourable characteristics will die✓ (6)

(10)

2.6 2.6.1 - Due to non-disjunction✓ / non-separation of a chromosome pair
- during Anaphase I✓
- Two chromosomes moved to the one pole✓ and
- none moved to the other pole✓ Any (3)

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

2.6.3 (a) Prophase I✓ (1)

(b) – Adjacent chromatids of homologous chromosomes cross✓
- at a point called the chiasma✓
- There is an exchange of DNA segments✓ / genetic material (3)

(10)

[50]

QUESTION 3

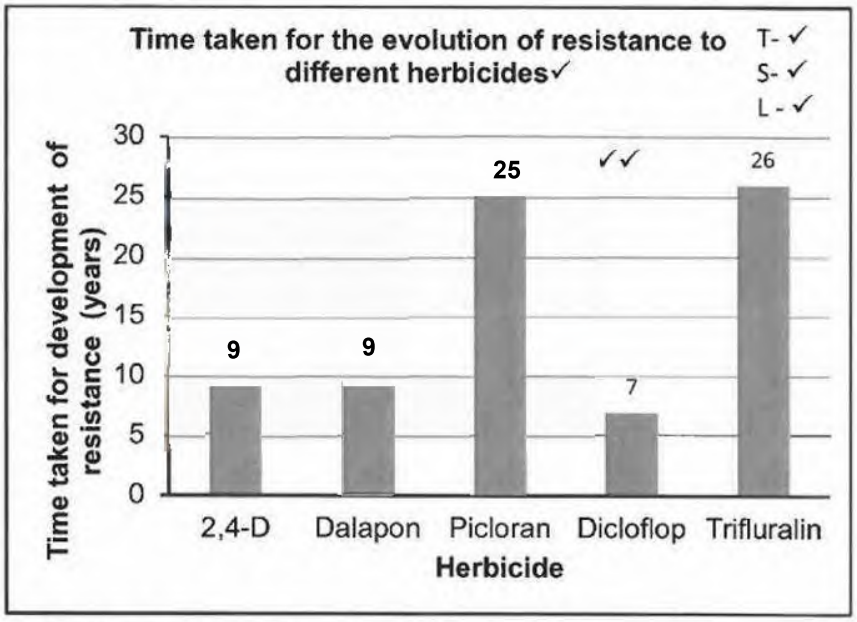
3.1 3.1.1 (a) Type of herbicide✓ (1)
(b) Time taken for weeds to develop resistance✓ (1)

3.1.2 (a) Dicloflop ✓ (1)
(b) Trifluralin ✓ (1)

3.1.3 (a) – They would apply the herbicide to the weed✓
- and observe if the weeds survive✓ (2)

(b) – it allows for a single variable✓
- to which the results can be attributed✓ (2)

3.1.4



Guideline for assessing the graph

Type: Bar graph drawn **(T)**	1
Title of graph	1
Correct: – **Scale** for Y-axis and **(S)** – Width and interval of bars on X-axis	1
Correct: – **Label** for X-axis and – **Label** and unit for Y-axis **(L)**	1
Plotting of bars	1- 1 to 4 bars plotted correctly 2- All 5 bars plotted correctly

(6)
(14)

3.2 3.2.1 - Foetus stem cells✓ / Umbilical cord/Foetus/amniotic fluid
- Embryonic stem cells✓ / Embryos
- Bone marrow✓/blood/ heart/ molar teeth / tissues or organs that already undergone development

(Mark first TWO only) Any (2)

3.2.2 - It can be developed into any tissue type ✓/ repair damage tissue
- Used for therapeutic purposes✓
- Treat spinal injuries✓
- Grown tissue cultures to form meat✓
(Mark first ONE only) Any (1)

3.2.3 450: 150✓
3:1✓ (2)
(5)

3.3 3.3.1 - Get permission from the principal/authorities to conduct the investigation✓
- Decide on the sample size✓
- Decide on sample selection✓
- Investigators to learn how to recognise/identify each trait✓
- Decide how to record results of the investigation✓
(Mark first TWO only) Any (2)

3.3.2 These traits are inherited✓ and not influenced by age✓ (2)

3.3.3 - They used 200 learners✓ (1)

3.3.4 Reject ✓ (1)

3.3.5 More learners displayed the recessive traits ✓ compared to the dominant traits✓ (2)

3.3.6 Discontinuous✓ variation (1)

3.3.7 The type of variation in a population with no intermediate phenotypes✓✓ (2)
(11)

3.4 - If a **population** of a single species becomes separated by a geographical barrier✓
- 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✓
- natural selection occurs independently in each of the two populations✓
- such that the individuals of the two populations become (very)

different✓ from each other
- genotypically and phenotypically✓
- Even if the two populations were to mix again✓
- they will not be able to interbreed✓
- The two populations are now different species✓ Any **(7)**

3.5 3.5.1
- Bare fingertips✓/nails instead of claws
- Opposable thumbs✓/ gripping ability
- Fingerprints✓
- Five fingers✓

(Mark first ONE only) Any (1)

3.5.2

Differences between African apes and humans	
African apes	**Humans**
- Small cranium✓	- Large cranium✓
- Brow ridges are well developed✓	- Brow ridges are not well developed✓
- Large canines✓	- Small canines✓
- Palate is long and rectangular✓ / U-shaped	- Palate is small and semi-circular✓/ C-shaped
- Large jaws✓	- Small jaws✓
- More protruding jaws✓/ prognathous	- Less protruding jaws✓/non-prognathous
- Cranial ridges present✓	- No cranial ridge✓
- Foramen magnum in a backward position✓	- Foramen magnum in a forward position✓
- Sloping face✓	- Flat face✓
- Less developed zygomatic arch✓	- More developed zygomatic arch✓
- Less developed chin✓	- More developed chin✓
- Diastema between the teeth✓	- No diastema between the teeth✓

(Mark first TWO only) Table 1 + (2X2) (5)

3.5.3 - short✓ and wide✓ (broad) (2)
(8)

3.6 3.6.1 Mitochondrial DNA✓ (1)

3.6.2
- Fossils of *Homo habilis* were found in Africa only✓
- The oldest fossils of *Homo erectus* were found in Africa✓, while
- the younger fossils of *Homo erectus* were found in other parts of the world✓
- The oldest fossils of *Homo sapiens* were found in Africa✓ while

- the younger fossils of Homo sapiens were found in other parts of the world✓ Any (4)

(5)

[50]

TOTAL SECTION 100

B:

150

TOTAL: