basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE EXAMINATIONS/ NATIONAL SENIOR CERTIFICATE EXAMINATIONS

LIFE SCIENCES P2

2022

MARKING GUIDELINES

MARKS: 150

These marking guidelines consist of 11 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 national 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.

19. **Changes to the memorandum**
No changes must be made to the memoranda. The provincial internal moderator must be consulted, who in turn will consult with the national internal moderator (and the Umalusi moderators where necessary).

20. **Official memoranda**
Only memoranda bearing the signatures of the national internal moderator and the Umalusi moderators and distributed by the National Department of Basic Education via the provinces must be used.

SECTION A

QUESTION 1

1.1	1.1.1	D✓✓		
	1.1.2	A✓✓		
	1.1.3	C✓✓		
	1.1.4	C✓✓		
	1.1.5	C✓✓		
	1.1.6	B✓✓		
	1.1.7	B✓✓		
	1.1.8	A✓✓		
	1.1.9	A✓✓		
	1.1.10	C✓✓	(10 x 2)	**(20)**
1.2	1.2.1	Cytokinesis✓		
	1.2.2	Ribose✓		
	1.2.3	Locus✓		
	1.2.4	(DNA) replication✓		
	1.2.5	Stem✓ cells		
	1.2.6	Segregation✓		
	1.2.7	Punctuated equilibrium✓		
	1.2.8	Chromatin✓network		
	1.2.9	Double helix✓		
	1.2.10	Interphase✓	(10 x 1)	**(10)**
1.3	1.3.1	A only✓✓		
	1.3.2	B only✓✓		
	1.3.3	Both A and B✓✓	(3 x 2)	**(6)**
1.4	1.4.1	Dihybrid✓ cross		(1)
	1.4.2	TTrr✓✓		(2)
	1.4.3	TR✓, Tr✓, tR✓, tr✓ **(Mark first FOUR only)**		(4) **(7)**
1.5	1.5.1	Males✓		(1)
	1.5.2	(a) 3✓/Three		(1)
		(b) 3✓/Three		(1)
	1.5.3	(a) T✓ U✓		(2)
		(b) X^HX^h✓✓		(2)
				(7)

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 2.1.1 Metaphase II✓ (1)

2.1.2 Individual chromosomes line up at the equator✓✓ of the cell (2)
(Mark first ONE only)

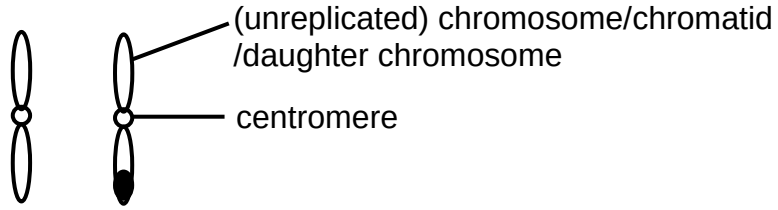
2.1.3 (a) Cell membrane✓ (1)

(b) Spindle fibre✓ (1)

2.1.4
- It contracts✓/shortens
- to pull the chromosomes✓/ daughter chromosomes/chromatids to opposite poles of the cell (2)

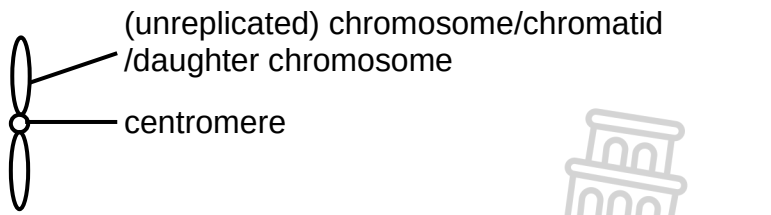
2.1.5

Structure C in the final phase of Meiosis/ Telophase II



OR

Structure C in the final phase of Meiosis/ Telophase II



Guideline for assessing the drawing

CRITERIA	ELABORATION	MARK
Heading (H)	- Structure **C** in the final phase of meiosis/Telophase II	1
Correct drawing (D)	- Daughter chromosome/ unreplicated chromosome/ chromatid/s drawn from structure **C** only	1
Correct shading (S)	- One unshaded - One with a shaded tip } **OR** one unshaded	1
Labels (L)	- Any 1 correct label	1

(4)
(11)

2.2 2.2.1 (a) Transcription✓ (1)
(b) Translation✓ (1)

2.2.2 (a) Nucleus✓ (1)
(b) mRNA✓ (1)

2.2.3 Chloroplasts✓
Mitochondria✓ (2)
(Mark first TWO only)

2.2.4
- The double helix DNA unwinds✓ and
- (the double-stranded DNA) 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-U, G-C)
- mRNA now has the coded message for protein synthesis✓

Any (7)

2.2.5 (a) TCG✓ (1)

(b) Tyrosine✓
Valine✓ **(in this sequence)** (2)
(Mark first TWO only)

2.2.6 Gene mutation✓ (1)

2.2.7
- The anticodon will be GGA✓/not GAA
- The last amino acid would be proline instead of leucine✓
- resulting in a different protein✓/ no protein at all (3)

(20)

2.3 2.3.1
- Either **male 1** or **male 2** could be the father✓ of the boy
- since both males have the I^B allele✓/ **male 1** I^AI^B and **male 2** I^BI^B or I^Bi
- The mother's blood group is O and must have the genotype ii✓/homozygous recessive
- The boy would have inherited the recessive allele/i from the mother✓
- and he would have the genotype I^Bi✓ (5)

2.3.2 Male 2✓ (1)

2.3.3
- Four/some bands of the boy's✓DNA profile
- match with those of the mother's✓ profile
- The remaining bands of the boy match with the bands of male **2**'s✓ DNA profile/fewer bands match with male **1**'s DNA profile (3)

2.3.4
- Tracing missing persons✓
- Identification of genetic disorders✓
- Establishing family relations✓
- Matching tissues for organ transplants✓
- Identifying dead persons✓/criminals/suspects Any (1)

(Mark first ONE only) **(10)**

2.4 2.4.1 Incomplete dominance✓ (1)

2.4.2
- The pink flower colour is an intermediate phenotype✓/ a blend of red and white
- indicating that neither of the alleles is dominant✓ (2)

2.4.3

P_1 /P_2	Phenotype		Pink	x	Pink✓
	Genotype		RW	x	RW✓
Meiosis					
	G/gametes		R, W	x	R, W✓
Fertilisation					
F_1 /F_2	Genotype		RR; RW; RW; WW✓		
	Phenotype		1 Red: 2 Pink: 1 White✓*		

P_1 & F_1✓/
P_2 & F_2
Meiosis and fertilisation✓

OR

P_1 /P_2	Phenotype		Pink	x	Pink✓
	Genotype		RW	x	RW✓

Meiosis

Fertilisation

Gametes	R	W
R	RR	RW
W	RW	WW

1 mark for correct gametes
1 mark for correct genotypes

F_1 /F_2	Phenotype	1 Red: 2 Pink: 1 White✓*

P_1 & F_1✓/
P_2 & F_2
Meiosis and fertilisation✓

(6)

1* **compulsory** + Any 5 **(9)**

[50]

QUESTION 3

3.1 3.1.1 B✓ (1)

3.1.2 - The foramen magnum is in a more forward position✓✓ (2)
(Mark first ONE only)

3.1.3

	A		B
1	Larger canines✓/teeth	1	Smaller canines✓/teeth
2	Jaws with teeth in a rectangular/U shape✓	2	Jaws with teeth on a gentle/round curve✓
3	More protruding jaw✓/ prognathous	3	Less protruding jaw✓/non-prognathous
4	Diastema present✓	4	No diastema✓

(Mark first TWO only) Table 1 + Any (2 x 2) (5)

3.1.4 - The spine is S-shaped✓*****
- to support upper body weight✓
- for shock absorption✓
- for flexibility✓ 1***** compulsory + Any 1 (2)

(10)

3.2 3.2.1 - Glyphosate resistance increased✓
- from 2009 to 2015✓
- and remained constant in 2016✓ (3)

3.2.2 $\left.\frac{45}{20}\right\}$ ✓ x 100✓ **OR** $\left.\frac{65 - 20}{20}\right\}$ ✓ x 100✓

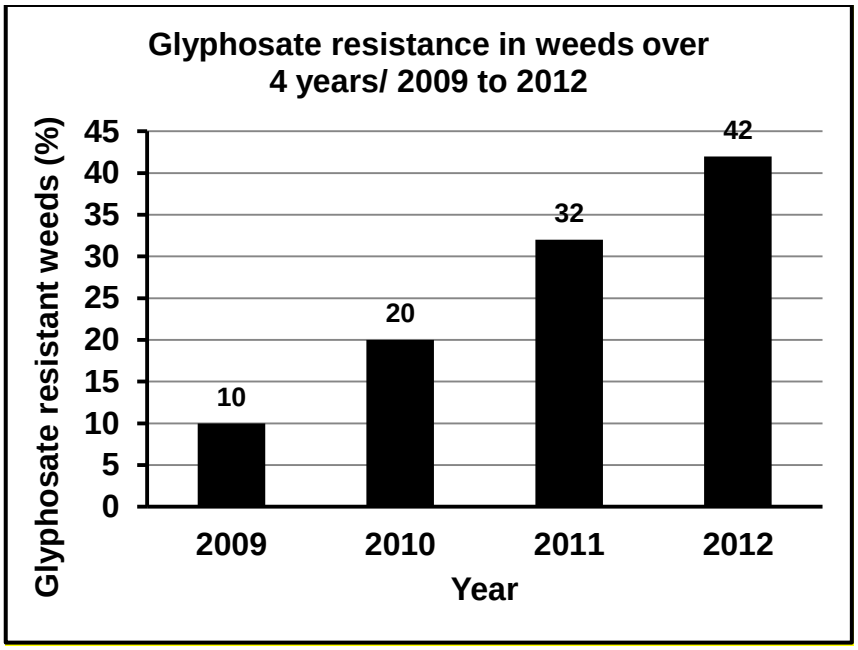
= 225✓% (3)

3.2.3 - The glyphosate will not kill the maize✓
- A greater yield✓ of maize
- means greater profit✓

OR

- Application of the glyphosate does not have to be selective✓
- This will save on labour✓/time/costs which
- means greater profit✓ (3)

3.2.4



Guideline for assessing the graph

CRITERIA	ELABORATION	MARK
Correct type of graph (T)	Bar graph drawn	1
Caption of graph (C)	Both variables included	1
Axes labels (L)	X- and Y-axis correctly labelled with units	1
Scale for X- and Y-axis (S)	- Equal space and width of bars for X-axis and - Correct scale for Y-axis	1
Plotting of co-ordinates (P)	- 1 to 3 co-ordinates plotted correctly - The 4 <u>required</u> co-ordinates plotted correctly	1 2

(6)
(15)

3.3 3.3.1
- They measured the jaw size of lizards on both islands✓ and
- determined the average jaw size for each population✓
- They compared the difference✓ between the two (3)

3.3.2
- A larger jaw allows for better muscle attachment✓/more teeth /larger teeth
- Thereby increasing the bite force✓/ability
- to break down✓the fibrous plant material (3)

3.3.3
- They allowed the lizards of the two islands to mate✓
- and determined that they were able to interbreed✓ and
- give rise to fertile offspring✓ Any (2)

3.3.4
- Biodiversity remains the same✓/there is no effect
- because the number of species remains the same✓/a new species has not been formed

OR

- Biodiversity decreases✓
- because some species of plants eaten on Island **B** could become extinct✓ (2)

3.3.5
- There is variation in the size of the lizards' jaws✓
- Some have small jaws and others have large jaws✓
- Due to the larger supply of (fibrous) plants✓/fewer insects
- those with smaller jaws will be unable to feed✓
- and die✓
- The lizards with the larger jaws will have more food✓
- and survive✓
- to reproduce✓
- The allele for larger jaws will be passed on to the offspring✓
- The next generation will have a higher proportion of lizards with larger jaws✓ Any (7)

(17)

3.4 3.4.1
- (Modern) humans originated in Africa✓ and
- then migrated to other continents✓ (2)

3.4.2 Hominidae✓ (1)

3.4.3 Mitochondrial DNA✓ (1)

3.4.4
- Fossils of *Ardipithecus* were found in Africa <u>only</u>✓
- Fossils of *Australopithecus* were found in Africa <u>only</u>✓
- Fossils of *Homo habilis* were found in Africa <u>only</u>✓
- The <u>oldest</u> fossils of *Homo erectus* were found in Africa✓
- The <u>oldest</u> fossils of *Homo sapiens* were found in Africa✓

Any (4)

(8)

[50]

TOTAL SECTION B: 100
GRAND TOTAL: 150