



# **basic education**

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Department:  
Basic Education  
**REPUBLIC OF SOUTH AFRICA**

## **SENIOR CERTIFICATE EXAMINATIONS/ NATIONAL SENIOR CERTIFICATE EXAMINATIONS**

**LIFE SCIENCES P2**

**MAY/JUNE 2024**

**FINAL MARKING GUIDELINES**

**MARKS: 150**

**These marking guidelines 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 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	B✓✓		
	1.1.2	C✓✓		
	1.1.3	C✓✓		
	1.1.4	B✓✓		
	1.1.5	A✓✓		
	1.1.6	D✓✓		
	1.1.7	C✓✓		
	1.1.8	B✓✓		
	1.1.9	D✓✓	(9 x 2)	<b>(18)</b>
1.2	1.2.1	Gene✓/allele		
	1.2.2	DNA profile✓		
	1.2.3	Punctuated equilibrium✓		
	1.2.4	Cloning✓		
	1.2.5	Stem cells✓		
	1.2.6	Colour blindness✓		
	1.2.7	Anther✓/pollen sac		
	1.2.8	Centromere✓	(8 x 1)	<b>(8)</b>
1.3	1.3.1	None✓✓		
	1.3.2	A only✓✓		
	1.3.3	None✓✓	(3 x 2)	<b>(6)</b>
1.4	1.4.1	DNA✓/Deoxyribo-nucleic acid		(1)
	1.4.2	(a) Hydrogen bond✓		(1)
		(b) Phosphate✓		(1)
	1.4.3	Ribose✓		(1)
	1.4.4	(a) 1✓		(1)
		(b) 1✓		(1)
				<b>(6)</b>
1.5	1.5.1	Chromosomal✓ mutation		(1)
	1.5.2	Sperm✓		(1)
	1.5.3	(a) 22✓		(1)
		(b) 2✓		(1)
	1.5.4	XXY✓✓/XYX		(2)
				<b>(6)</b>

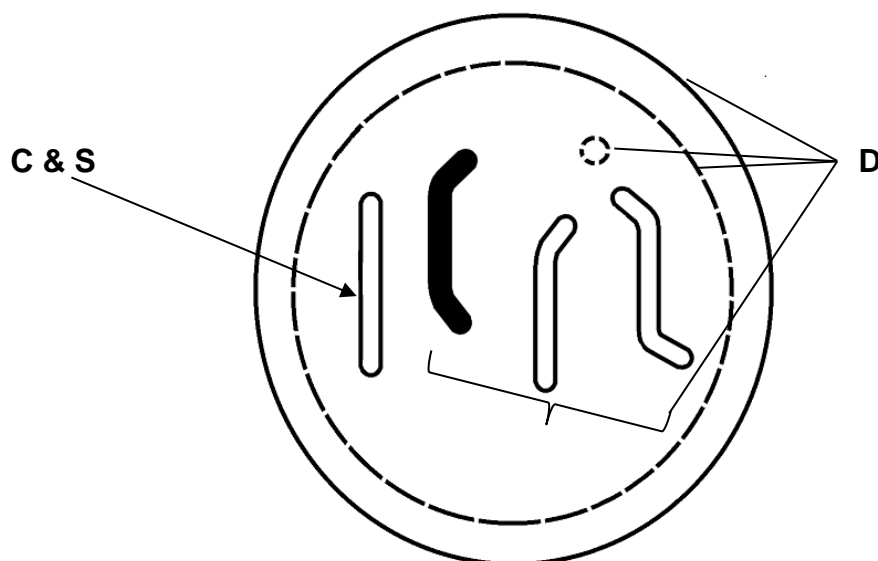
1.6	1.6.1	Cladogram✓/Phylogenetic tree		(1)
	1.6.2	(a) <i>Ardipithecus</i> ✓		(1)
		(b) C✓		(1)
	1.6.3	<ul style="list-style-type: none"><li>- <i>P. troglodytes</i>✓</li><li>- <i>G. gorilla</i>✓</li><li>- Most recent common ancestor of <i>H. sapiens</i> and <i>H. neanderthalensis</i></li></ul> <b>(Mark first TWO only)</b>	Any	(2)
	1.6.4	<ul style="list-style-type: none"><li>- Mrs Ples✓</li><li>- Taung child✓</li><li>- Little foot✓</li></ul> <b>(Mark first ONE only)</b>	Any	(1) <b>(6)</b>

**TOTAL SECTION A: 50**

**SECTION B****QUESTION 2**

- |      |       |   |     |                   |
|------|-------|---|-----|-------------------|
| 2.1  | 2.1.1 | Ribosome✓   |     | (1)               |
|      | 2.1.2 | - Brings the required/specific amino acid✓<br>- according to mRNA✓/codon to the ribosome  |     | (2)               |
|      | 2.1.3 | (a) CCU✓  |     | (1)               |
|      |       | (b) GTA✓✓   |     | (2)               |
|      | 2.1.4 | - A mutation occurred✓<br>- that changed the sequence of nitrogenous bases on DNA from GGG to GAA✓/when A replaced G<br>- mRNA codon changed from CCC to CUU✓/when U replaced C<br>- causing tRNA to bring a different amino acid✓  | Any | (3)<br><b>(9)</b> |
| 2.2  |       | - The DNA double helix unwinds✓<br>- The DNA strands unzip✓/weak hydrogen bonds break<br>- to form two separate strands✓<br>- One strand is used as a template✓<br>- to form mRNA✓<br>- using free RNA nucleotides✓ from the nucleoplasm<br>- The mRNA is complementary to the DNA✓/A pairs with U, G pairs with C and T pairs with A<br>- mRNA now has the coded message✓ for protein synthesis  | Any | <b>(6)</b>        |
| 2.3. | 2.3.1 | Cell membrane✓  |     | (1)               |
|      | 2.3.2 | Produces spindle fibres✓<br><b>(Mark first ONE only)</b>  |     | (1)               |
|      | 2.3.3 | - Random arrangement of chromosomes✓ at the equator<br>- results in the formation of genetically different gametes✓<br>- This leads to increased genetic variation in a population✓<br>- which will cause some individuals to have favourable and some to have unfavourable characteristics✓<br>- When environmental conditions change✓<br>- those with favourable characteristics will survive✓<br>- and those with unfavourable characteristics will die✓ | Any | (6)               |

2.3.4

**Criteria for assessing the drawing**

Criteria	Mark
Cell D copied correctly ( <b>D</b> )	1
Missing chromosome drawn has a straight shape ( <b>C</b> )	1
Missing chromosome is unshaded ( <b>S</b> )	1

(3)  
(11)

2.4      2.4.1      Three✓/3

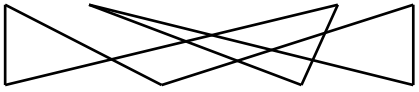
(1)

2.4.2      bb✓

(1)

- 2.4.3
- Both parents (5 and 6) have a dominant and a recessive allele✓/Bb
  - since they do not have cystic fibrosis✓.
  - They have children 8 and 9 with cystic fibrosis✓/who are homozygous recessive/bb
  - who received one recessive allele from each parent✓

(4)

2.4.4	<b>P<sub>1</sub></b>	Phenotype	(Male) without cystic fibrosis	x	(Female) without cystic fibrosis✓
		Genotype	Bb	x	Bb✓
	Meiosis	<b>G/gametes</b>	B , b	x	B , b✓
	Fertilisation				
	<b>F<sub>1</sub></b>	Genotype	BB , Bb , Bb , bb✓		
		Phenotype	3 without cystic fibrosis: 1 with cystic fibrosis✓		

P<sub>1</sub> and F<sub>1</sub>✓

Meiosis and fertilisation✓

Any 6

**OR**

<b>P<sub>1</sub></b>	Phenotype	(Male) without cystic fibrosis	x	(Female) without cystic fibrosis✓
	Genotype	Bb	x	Bb✓

Meiosis

Fertilisation

Gametes	B	b
B	BB	Bb
b	Bb	bb

1 mark for correct gametes  
1 mark for correct genotypes

<b>F<sub>1</sub></b>	Phenotype	3 without cystic fibrosis: 1 with cystic fibrosis✓		
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P<sub>1</sub> and F<sub>1</sub>✓

Meiosis and fertilisation✓

Any 6

(6)  
(12)

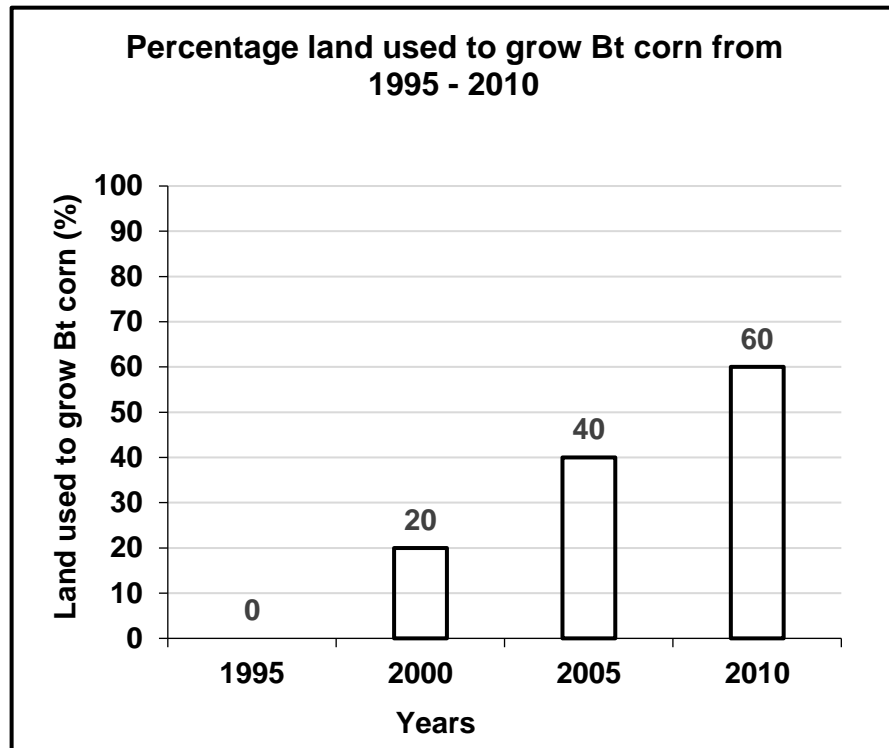
- 2.5      2.5.1      - The gene for insect resistance is isolated from another species✓  
                          - and inserted into the DNA of corn✓ where it is expressed (2)
- 2.5.2      As (the percentage of) land used to grow Bt corn increases the amount of insecticide used decreases✓✓ (2)
- 2.5.3      - Longer shelf-life✓  
                          - Drought resistance✓  
                          - More nutrients✓  
                          - Frost-resistant✓  
                          - Increased size✓  
                          - Increased crop yield✓  
                          - Herbicide-resistant✓  
                          - No allergens✓  
                          - Heat-tolerant✓  
                          - Disease-resistant✓  
                          **(Mark first TWO only)**

Any

(2)



2.5.4

**Criteria for marking of the graph:**

Criteria	Mark allocation
Bar graph is drawn (T)	1
Caption of the graph includes both variables (C)	1
Correct labels on the X-axis and Y-axis with correct unit on the Y-axis (L)	1
Correct scale for Y-axis and bars of equal width and spaces for X-axis (S)	1
Plotting (P) correctly done for: 1- 3 years	1
All 4 required years	2

(6)  
(12)

If a histogram or line graph is drawn, marks will be lost for:

- Type of graph
- Scale

If axes are transposed:

- Can get all marks if labels are also swopped and bars are horizontal
- If labels are not corresponding, then:
  - Marks will be lost for labels and scale
  - Plotting can get credit if coordinates are correct for given labels

**[50]**

**QUESTION 3**

- 3.1 3.1.1 - It is harmful✓ /prevents clotting of blood  
- and leads to excessive bleeding✓ /internal bleeding/ swelling of joints/ bruising (2)
- 3.1.2  $\left[ \frac{25}{100} \times 25\,000 \right] \checkmark = 6250 \checkmark$
- OR**
- 25% x 25000✓ / (0,25 x 25000) = 6250✓
- OR**
- $\frac{25000}{4} \checkmark = 6250 \checkmark$  (2)
- 3.1.3 - Males have only one X-chromosome✓/XY  
- If this chromosome carries the recessive allele the male will have haemophilia✓  
- as there is no other allele that could mask the effect of the recessive allele✓ (3)  
**(7)**
- 3.2 3.2.1 (a) (Presence or absence of) tall trees✓ (1)  
(b) (Presence or absence of) wings on the stoneflies✓ (1)
- 3.2.2 - Type of net/ apparatus used to catch the insects✓  
- Season of collection✓/collection was done in summer  
- Time of day for collection✓/collection was done in the morning  
- Type of location for each category✓  
- Number of locations for each category✓  
- Labelling of samples was done according to the area of collection✓ Any (2)  
**(Mark first TWO only)**
- 3.2.3 - Collected thousands of stoneflies✓  
- Three (3) locations for each category✓ (2)  
**(Mark first TWO only)**
- 3.2.4 - Flying is dangerous✓ in areas without trees  
- However, stoneflies with no wings survived since they could not fly✓  
- Therefore, they reproduced✓  
- Passing the allele for no wings to the next generation✓ (4)
- 3.2.5 - All stoneflies had wings✓  
- Due to strong winds✓ /since it was dangerous to fly in cleared areas  
- They stopped using their wings✓/flying  
- The wings became smaller✓/disappeared  
- The acquired characteristic of no wings was passed on to the offspring✓  
- All offspring in the next generation had no wings✓ Any (5)  
**(15)**

- 3.3
- If a population of a single species becomes separated by a geographical barrier✓ (sea, river, mountain, lake)
  - then the population splits into two✓
  - There is no gene flow between the two populations✓
  - Each population may be exposed to different environmental conditions✓/the selection pressure may be different
  - and therefore natural selection occurs independently✓
  - such that the individuals of the two populations become different✓ genotypically and phenotypically✓
  - Even if these populations were to mix again✓
  - they will not be able to interbreed✓
  - because they are now different species✓
- Any (7)
- 3.4
- 3.4.1
- Eyes in front✓
  - Binocular vision✓
  - Stereoscopic vision✓
  - Colour vision✓/presence of cones
- (Mark first THREE only)**
- Any (3)
- 3.4.2
- Gorilla gorilla*✓
- (1)
- 3.4.3
- Large canines✓/teeth
  - Large jaw✓
- (Mark first TWO only)**
- (2)
- 3.4.4
- More forward position of the foramen magnum✓
  - Allows the spine to enter vertically✓beneath the skull
  - to support the skull✓/ upright walking
- (3)
- 3.4.5
- (a)
- *Homo sapiens* has an S-shaped✓ spine
  - *Gorilla gorilla* has a C-shaped✓ spine
- (2)
- (b)
- *Homo sapiens* has a short and wide✓ pelvis
  - *Gorilla gorilla* has a long and narrow✓ pelvis
- (2)
- 3.4.6
- For the attachment of strong muscles✓
  - to assist in eating tough/hard food✓
- (2)  
**(15)**

3.5	3.5.1	<p>Datura flowers:</p> <ul style="list-style-type: none"> <li>- release a powerful fragrance✓ that attracts hawk moths✓</li> <li>- release a highly addictive nectar✓ that ensures that the hawk moths only visit it✓/stays longer in the flower</li> <li>- open in the evening✓ and this ensures visit by moth✓</li> <li>- are adapted to a specific pollinator✓ since they attract hawk moths✓</li> </ul>	Any (2 x 2)	(4)
	<b>(Mark first TWO only)</b>			
	3.5.2	<ul style="list-style-type: none"> <li>- Reproduction is at different times of the year✓</li> <li>- Infertile offspring✓</li> <li>- Prevention of fertilisation✓</li> </ul>	Any	(2)
	<b>(Mark first TWO only)</b>			<b>(6)</b>
				<b>[50]</b>
				<b>TOTAL SECTION B: 100</b>
				<b>GRAND TOTAL: 150</b>