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basic education

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)	(18)
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)	(8)
1.3	1.3.1	None✓✓		
	1.3.2	A only✓✓		
	1.3.3	None✓✓	(3 x 2)	(6)
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)
				(6)
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)
				(6)

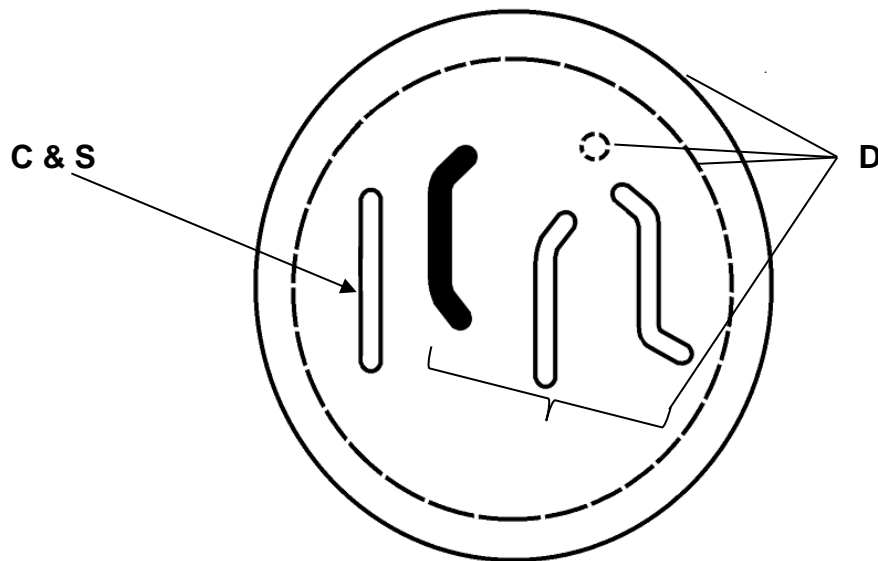
1.6	1.6.1	Cladogram✓/Phylogenetic tree		(1)
	1.6.2	(a) <i>Ardipithecus</i> ✓		(1)
		(b) C✓		(1)
	1.6.3	<ul style="list-style-type: none"> - <i>P. troglodytes</i>✓ - <i>G. gorilla</i>✓ - Most recent common ancestor of <i>H. sapiens</i> and <i>H. neanderthalensis</i> 	Any	(2)
		(Mark first TWO only)		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

TOTAL SECTION A: 50

SECTION B**QUESTION 2**

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

2.3.4

**Criteria for assessing the drawing**

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

(3)
(11)

2.4 2.4.1 Three✓/3

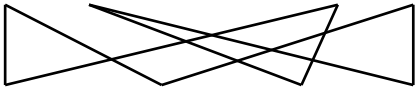
(1)

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	P₁	Phenotype	(Male) without cystic fibrosis	x	(Female) without cystic fibrosis✓
		Genotype	Bb	x	Bb✓
	Meiosis	G/gametes	B , b	x	B , b✓
	Fertilisation				
	F₁	Genotype	BB , Bb , Bb , bb✓		
		Phenotype	3 without cystic fibrosis: 1 with cystic fibrosis✓		

P₁ and F₁✓

Meiosis and fertilisation✓

Any 6

OR

P₁	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

F₁	Phenotype	3 without cystic fibrosis: 1 with cystic fibrosis✓		
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P₁ and F₁✓

Meiosis and fertilisation✓

Any 6

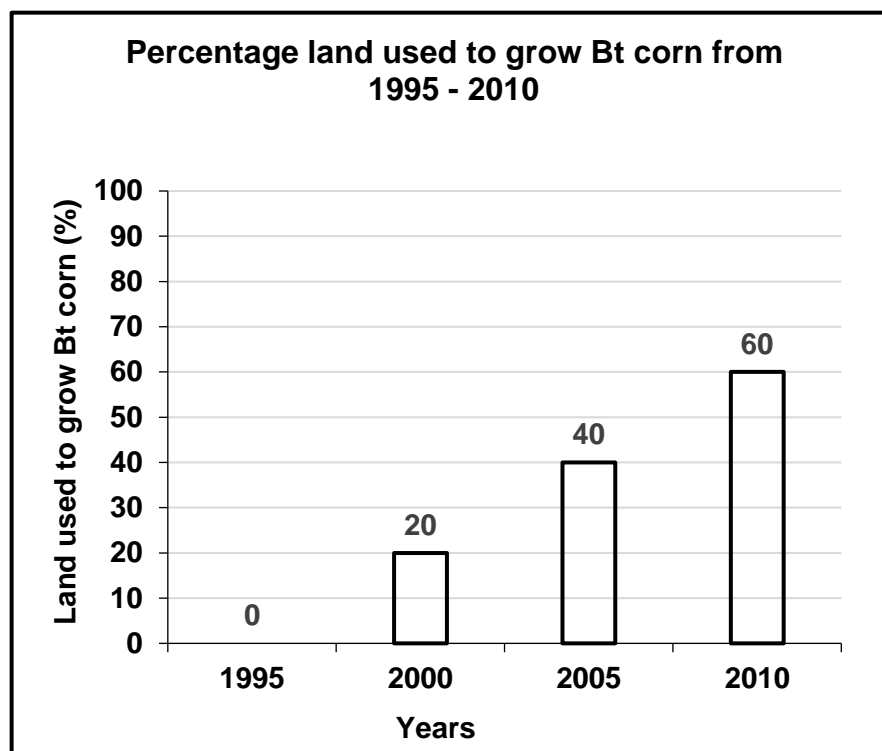
(6)
(12)

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