basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

LIFE SCIENCES P1

VERSION 1 (NEW CONTENT) FOR FULL-TIME CANDIDATES

FEBRUARY/MARCH 2013

MEMORANDUM

MARKS: 150

This memorandum consists of 10 pages.

PRINCIPLES RELATED TO MARKING LIFE SCIENCES 2013

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-recognized abbreviations**
   Accept if first defined in answer. If not defined, do not credit the unrecognised 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, drawings, 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. A marker that is proficient in the relevant official language should be consulted. This is applicable to all official languages.

19. No changes must be made to the marking memoranda without consulting the Provincial Internal Moderator who in turn will consult with the National Internal Moderator (and the External moderators where necessary)

20. Only memoranda bearing the signatures of the National Internal Moderator and the UMALUSI moderators and distributed by the National Department of Education via the Provinces must be used.

SECTION A

QUESTION 1

1.1	1.1.1	B✓✓		
	1.1.2	B✓✓		
	1.1.3	A ✓✓		
	1.1.4	D✓✓		
	1.1.5	D✓✓		
	1.1.6	B✓✓		
	1.1.7	A✓✓		
	1.1.8	C✓✓		
	1.1.9	D✓✓		
	1.1.10	D✓✓	(10 x 2)	**(20)**
1.2	1.2.1	Biogeography ✓		
	1.2.2	Extinction✓		
	1.2.3	Chiasma ✓		
	1.2.4	Translation ✓		
	1.2.5	Polygenic✓		
	1.2.6	Haemophilia✓		
	1.2.7	Locus✓		**(7)**
1.3	1.3.1	Both A and B✓✓		
	1.3.2	B only✓✓		
	1.3.3	B only✓✓		
	1.3.4	Both A and B ✓✓		
	1.3.5	Both A and B ✓✓		
	1.3.6	Both A and B ✓✓		
	1.3.7	Both A and B ✓✓		
	1.3.8	B only✓✓	(8 x 2)	**(16)**
1.4	1.4.1	Normal✓wings		(1)
	1.4.2	(a)Gg✓		(1)
		(b) gg✓		(1)
	1.4.3	Gg✓✓		(2)
		gg✓✓ (any order)		(2)
				(7)
			TOTAL SECTION A:	**50**

SECTION B

QUESTION 2

2.1 2.1.1 (a) deoxyribose✓ sugar (1)
(b) phosphate✓ group (1)

2.1.2 (a) Guanine✓ (1)
(b) Guanine✓ (1)

2.1.3 The formed complementary strand✓ contains thymine✓/ not uracil
Both strands of DNA molecule✓ are being used as a template✓
Any (1 x 2) (2)
(6)

2.2 2.2.1 **P_1**/parent phenotype affected female x unaffected male✓
genotype $X^R X^r$ x $X^r Y$ ✓

Meiosis

G/gametes X^R, X^r x X^r, Y✓

Fertilisation

F_1/offspring genotype $X^R X^r$, $X^R Y$, $X^r X^r$ & $X^r Y$ ✓
phenotype 1 affected daughter, 1 affected son, 1 unaffected daughter & 1 unaffected son ✓

Parents and offspring✓/P_1 and F_1
Meiosis and fertilisation✓ (Any)

OR

P_1/parent phenotype affected female x unaffected male✓
genotype $X^R X^r$ x $X^r Y$ ✓

Meiosis

Fertilisation

Gametes	X^R	X^r
X^r	$X^R X^r$	$X^r X^r$
Y	$X^R Y$	$X^r Y$

1 mark for correct gametes
1 mark for correct genotypes

F_1/offspring phenotype 1 affected daughter, 1 affected son, 1 unaffected daughter, & 1 unaffected son ✓

Parents and offspring✓/P_1 and F_1
Meiosis and fertilisation✓ (Any) (6)

	2.2.2	25✓✓ %	(2)
	2.2.3	It is caused by a dominant allele✓carried on the X-chromosome, which both males and females have✓	(2)
	2.2.4	(a) Point✓mutation (b) A different amino acid would be coded for✓ resulting in a different protein✓	(1) (2)
	2.2.5	To determine the chances of having a child with the disorder✓ Help them evaluate whether they would cope with such a child✓ Help them make an informed decision on whether to have children ✓ **(Mark first TWO only)** (Any)	(2) **(15)**
2.3	2.3.1	381✓	(1)
	2.3.2	(Met – Met)✓ – (Arg – Arg – Arg)✓ - Asn✓	(3) **(4)**
2.4	2.4.1	Diagram A✓	(1)
	2.4.2	Crossing over✓took place/ there was exchange of genetic material/ there was random assortment of chromosomes (Any)	(1)
	2.4.3	2✓	(1)
	2.4.4	It increases genetic variation✓ Reduces the number of chromosomes by half✓ Results in formation of gametes✓ Ensures that the chromosome number remains constant within species✓ **(Mark first TWO only)** (Any)	(2) **(5)** **[30]**

QUESTION 3

3.1	3.1.1	Projecting nose✓ Smaller canines ✓ Bipedal✓ **(Mark first THREE only)**	(3)
	3.1.2	They had a wider view✓ to spot danger They could carry offspring✓/food/tools Large surface area for thermoregulation✓ **(Mark first TWO only)**	(2)
	3.1.3	Have characteristics of both *Homo*✓ species and *Australopithecus*✓ species	(2) **(7)**

3.2 3.2.1 The oldest fossils ✓of hominids (Australopithecines and *Homo habilis*) are only found in Africa✓,
whilst the younger fossils are found worldwide✓ which suggests that humans originated in Africa.
The oldest *Homo erectus* fossils ✓ was found in Africa and later in Europe and Asia,
which suggests that *Homo erectus* migrated✓ out of Africa (Any) (3)

3.2.2 The hypothesis will be rejected✓
It would imply that the origins of humans is in Asia✓ not Africa (2)

3.2.3 Mutations in mitochondrial DNA (mtDNA)✓can be traced to a female ancestor in Africa✓
Mutations in Y chromosome ✓can be traced to a male ancestor in Africa✓ (4)
(9)

3.3 3.3.1 (a) Wing of an insect✓and wing of a bat✓ (2)
(b) Human forelimb✓ and wing of a bat✓ (2)

3.3.2 Similar structure ✓ indicates that they originate from the same ancestor ✓ (2)
(6)

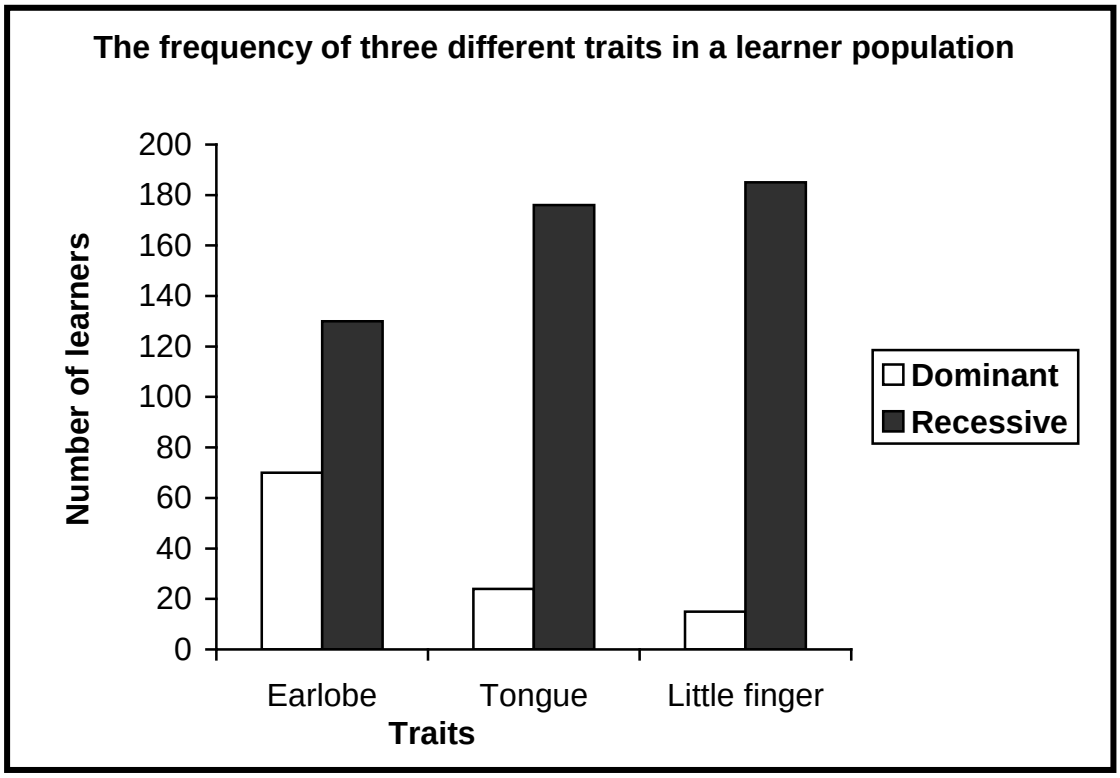
3.4 Finch population had variation✓/ different beak sizes
*** The population was separated by a geographical✓/physical barrier**
*** Allopatric ✓speciation took place**
As the separate islands had different environmental conditions ✓/ have different vegetation/different food for finches
Each group underwent natural selection independently✓
And developed differently✓
Genotypically and phenotypically✓
Gene flow✓/ reproduction between the different populations did not occur
Resulting in new species being formed✓
***Compulsory 2 marks and any other 6** **(8)**
[30]

TOTAL SECTION B: 60

SECTION C

QUESTION 4

4.1 4.1.1



Rubric for the mark allocation of the graph

Correct type of graph	1
Caption for graph	1
Correct label for X-axis and appropriate width of bars	1
Graphs labelled/key provided for 2 graphs	1
Correct label for Y-axis and appropriate scale for Y-axis	1
Drawing of graphs	1 – 1 to 2 bars plotted correctly 2 – 3 to 5 bars plotted correctly 3 – 6 bars plotted correctly

(8)

NOTE:
If the wrong type of graph is drawn, marks will be lost for 'correct type of graph'.
If graphs are not drawn on the same system of axes, mark the first graph only using the given criteria

	4.1.2	These traits are inherited✓ and not influenced by age✓	(2)
	4.1.3	Had a large sample size✓	(1)
	4.1.4	- Get permission from the principal/authorities to conduct the investigation✓ - Decide on the appropriate time/day 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)**	(2)
	4.1.5	Rejected✓	(1)
	4.1.6	More learners✓ displayed the recessive traits compared to the dominant traits✓	(2) **(16)**
4.2	4.2.1	2✓	(1)
	4.2.2	rr✓	(1)
	4.2.3	Rr✓/ heterozygous	(1)
	4.2.4	RR✓/ homozygous dominant	(1) **(4)**

4.3 **Charles Darwin explanation**

- As a result of genetic variation✓/ some giraffes have longer necks than others✓
- Environmental change✓/ when the leaves became scarce in short trees
- competition for resources occurred✓
- causing those with shorter necks to die✓
- and those with longer necks to survive✓
- This is natural selection✓/survival of the fittest
- The genes✓/genotype for longer necks
- were passed on to subsequent generations✓
- as a result now the population of giraffe have long necks✓

max (8)

Jean Baptiste de Lamarck explanation

- All giraffes had short necks✓originally
- When the leaves became scarce in short trees✓ / lower parts of trees
- Giraffes stretched✓ / used their neck more often to reach to the taller trees
- As a result the neck became longer✓ /developed
- This acquired characteristic ✓was passed on to the offspring✓
- The next generation of giraffes had long necks✓

Max (6)

An idea accepted in the science community today

Charles Darwin✓ - there is evidence✓ that genes are inherited from the parents,✓and is not the acquired characteristics✓

Max (3)

Content (17)
Synthesis (3)

ASSESSING THE PRESENTATION OF THE ESSAY

Marks	Description
3	Well structured- demonstrate insight and understanding of question
2	Minor gaps or irrelevant information in the logic and flow of the answers
1	Attempted but with significant gaps and irrelevant information in the logic and flow of the answers
0	Not attempted/nothing written other than question number/ no correct information

(20)

TOTAL SECTION C: 40
GRAND TOTAL: 150