basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE EXAMINATION

LIFE SCIENCES P2

2015

MEMORANDUM

MARKS: 150

This memorandum consists of 11 pages.

R van der Watt
Watt
INT MOD
05/07/2015

P.M. Wiese
External Moderator
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5/7/2015

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5/07/2015

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INT MOD.

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.

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15. **If units are not given in measurements**
Candidates will lose marks. Memorandum will allocate marks for units separately.

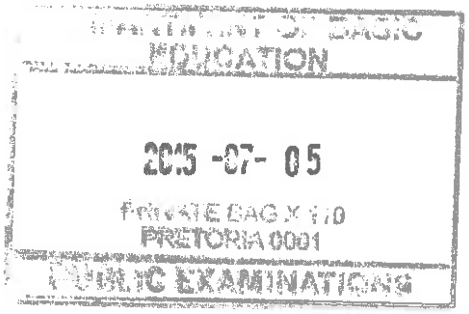
16. **Be sensitive to the sense of an answer, which may be stated in a different way.**

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 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. **Changes to the memorandum**
No changes must be made to the memoranda without consulting the provincial internal moderator 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.



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SECTION A

QUESTION 1

1.1	1.1.1	A✓✓		
	1.1.2	C✓✓		
	1.1.3	A✓✓		
	1.1.4	C✓✓		
	1.1.5	B✓✓		
	1.1.6	A✓✓/B		
	1.1.7	B✓✓		
	1.1.8	A✓✓	(8 x 2)	**(16)**
1.2	1.2.1	Incomplete dominance ✓/(co dominance)		
	1.2.2	Sex-linked✓		
	1.2.3	Homologous ✓ chromosome		
	1.2.4	Amino acids✓		
	1.2.5	Co dominance✓		
	1.2.6	Stem cells✓/(meristematic)		
	1.2.7	Transitional ✓		
	1.2.8	Recessive✓		
	1.2.9	Monohybrid✓	(9 x 1)	**(9)**
1.3	1.3.1	None✓✓		
	1.3.2	A only✓✓		
	1.3.3	A only ✓✓		
	1.3.4	Both A and B✓✓	(4 x 2)	**(8)**
1.4	1.4.1	(a) RrTT✓		(1)
		(b) rrtt✓		(1)
	1.4.2	RT✓ rT✓		(2)
	1.4.3	(a) Red fruit, short✓		(1)
		(b) Red fruit, tall✓		(1)
	1.4.4	RRTT✓✓		(2)
				(8)
1.5	1.5.1	Prophase II✓/Telophase I		(1)
	1.5.2	(a) D✓- centriole✓/(centrosome)		(2)
		(b) B✓- chromosome✓		(2)
		(c) E✓- centromere✓		(2)
	1.5.3	(a) 4✓		(1)
		(b) 2✓		(1)
				(9)

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 2.1.1 A group of organisms of the **same** species✓ that can interbreed to produce **fertile** offspring✓ (2)

2.1.2
- Crossing over✓
- Random arrangement✓of chromosomes
- Independent assortment ✓/random segregation / random assortment
- Mutations✓

} Meiosis✓

- Chance fertilization✓/Random fertilization
- Random mating✓

(Mark first FOUR only) (Any 4) (4)

2.1.3 (a) Speciation✓ (1)

(b)
- The **rocky island✓* /geographic barrier**
- separated the fish into two populations✓
- with different environmental conditions✓ on each side
- Each group underwent natural selection independently✓
- and developed differently✓
- Each group became genotypically✓
- and phenotypically✓ different
- which prevented them from interbreeding✓ leading to the formation of a new species

***1 compulsory** + any 5 (6)
(13)

2.2

P_2	Phenotype	Grey male	x	Albino female✓
	Genotype	Gg	x	gg✓
Meiosis				
	G/gametes	G, g	x	g, g✓
Fertilisation				
F_2	Genotype	Gg; Gg; gg; gg ✓		
	Phenotype	2 grey rabbits : 2 albino rabbits ✓		

Phenotypic ratio of offspring is *1 : 1✓
P_2 and F_2✓
Meiosis and fertilisation✓

***1 compulsory** + any 6

OR

P_2	Phenotype	Grey male	x	Albino female✓
	Genotype	Gg	x	gg✓
Meiosis				
Fertilisation				

Gametes	G	g
g	Gg	gg
g	Gg	gg

1 mark for correct gametes
1 mark for correct genotypes

F_2 Phenotype 2 grey rabbits : 2 albino rabbits ✓

Phenotypic ratio of offspring is *1 : 1✓
P_2 and F_2✓
Meiosis and fertilisation✓

***1 compulsory** + any 6 **(7)**

2.3 2.3.1 (a) DNA✓ molecule **(1)**

(b) Amino acid✓ **(1)**

2.3.2 Transcription✓ **(1)**

2.3.3
- The sequence of nitrogen bases on molecule W/DNA will change✓
- This would cause a corresponding change on the molecule X✓/mRNA
- The amino acid brought in by tRNA will be different✓
- A different protein will form✓ **(4)**

2.3.4 (a) UCU✓ **(1)**

(b) Arginine✓ ; Methionine✓ ; Glycine✓
(Must be in the correct order) **(3)**
(11)

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2.4 2.4.1 Using/not using DNA evidence increases/decreases the number of people found guilty of crimes✓✓

OR

Using/not using DNA evidence has no effect in finding people guilty of crimes✓✓ (2)

2.4.2 Number of people✓ found guilty/convicted (1)

2.4.3 44 – 25✓ = 19✓ (2)

2.4.4
- More criminals are found guilty when DNA evidence is included✓in the investigation
- DNA found at a crime scene✓
- can be compared to the DNA database✓
- making it easier✓/faster
- to identify suspects in the crime✓

any 4 (4)
(9)
[40]

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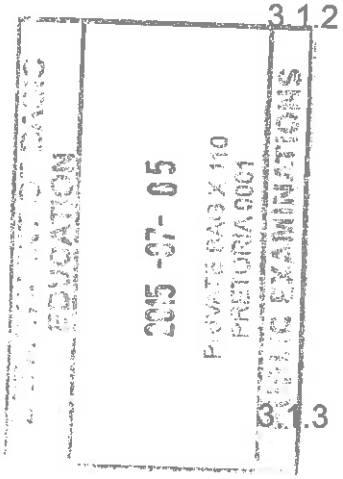
QUESTION 3

3.1 3.1.1
- Predators may mistake it✓
- *for A. ochlea*✓
- which has an unpleasant taste✓ (3)



3.1.2
- There was variation ✓amongst the *H. deceptor* butterflies
- Some butterflies did not appear similar✓ to *A. ochlea*
- Those that did not appear similar to *A. ochlea* were preyed upon✓/died
- Some were similar in appearance✓to the *A. ochlea* butterfly
- Fewer of these butterflies were preyed upon✓
- and more of them survived✓
- They passed this gene to their offspring✓
- More butterflies in the next generation were similar in appearance to the *A. ochlea*✓ Any 6 (6)

3.1.3
- In natural selection the environment/nature is the driving/selective force✓ while in artificial selection humans represent the selective force✓
- Natural selection occurs in response to suitability to the environment✓ while artificial selection is in response to satisfying human needs✓
- Natural selection occurs within a species✓ while artificial selection may involve one or more species✓

(Mark first ONE only) (Any 1 x 2) (2)
(11)

3.2 3.2.1 Phylogenetic tree✓ (1)

3.2.2 (a) 2✓ (1)

(b) 7✓ (1)

3.2.3
- *A. boisei* and *A. robustus* share a more recent✓
- common ancestor✓ (2)

3.2.4 *Homo habilis*✓ (1)

3.2.5 Taung child✓, Mrs Ples✓ } *A. africanus*✓
Karabo✓/*A. sediba*
Little foot✓ /*A. prometheus*
(Mark first TWO only) Any 2 (2)

3.2.6
- The **oldest** fossils of *Homo*✓/*Homo habilis* /*Homo erectus*
- are found only in Africa ✓
- The **younger** fossils of *Homo*✓/*Homo erectus*
- were found in Africa and other parts of the world✓
- This implies that earliest *Homo* sp. evolved in Africa✓/*Homo erectus* migrated out of Africa

Any 3 (3)
(11)

3.3 3.3.1 A✓ and D✓
(Mark first TWO only) (2)

3.3.2
- The pelvis is wide✓/cup-shaped
- to support the weight✓ of an organism walking upright (2)

3.3.3 Diagram A
- The foramen magnum is located centrally✓/more forward position below the skull
- so that the vertebral column arises from beneath the skull✓
- for bipedalism✓

any 2

Diagram B
- The foramen magnum is located towards the back✓ of the skull
- so that the vertebral column arises from the back of the skull✓
- for quadrupedal locomotion✓

any 2 (4)

3.3.4

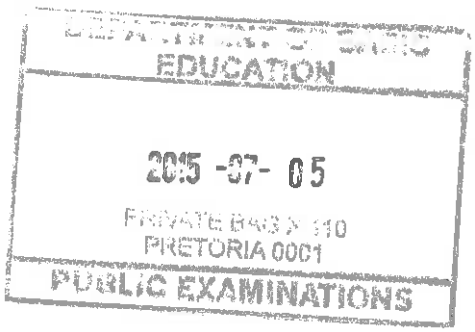
Diagram A	Diagram B
Gently curved✓/C-shaped jaw	Rectangular✓/U-shaped jaw
Small jaws✓	Large jaws✓
Smaller canines✓ /(teeth)	Larger canines✓/(teeth)
No diastema/Fewer spaces between the teeth✓	Diastema present/Larger spaces between the teeth✓

Table format 1

(Mark first THREE only) Any 3 x 2 6 (7)

3.3.5 Freely rotating arm✓
Rotation around elbow joints✓
Rotation around the wrist✓
Bare fingertips/nails instead of claws✓
Long upper arms✓
Opposable thumbs✓
Five fingers✓
(Mark first THREE only)

Any 3 (3)
(18)
[40]



TOTAL SECTION B: 80

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SECTION C

QUESTION 4

Mutations

- Mutations refer to sudden changes✓
- in the genetic composition of an individual✓

- Gene mutations✓
- result in a change in the structure of the DNA in a single gene✓

- Chromosomal aberrations✓
- are changes in the normal structure/number of chromosomes✓

- Harmful/lethal mutations✓
- result in genetic disorders✓/characteristics that decrease the survival of an organism

Any 5 (5)

Genetic disorders

- Haemophilia✓
- Blood does not clot✓
- because the protein for blood clotting is not produced✓

- Colour blindness✓
- The person cannot differentiate between different colours✓
- due to the absence of the necessary protein for photoreception✓

- Albinism✓
- The lack of pigment in the skin✓
- due to the absence of the protein that forms melanin✓

- Down syndrome✓
- The person has an extra copy of chromosome 21✓
- due to non-disjunction✓ during meiosis.

(4 x 3) (12)

Content: (17)
Synthesis: (3)
(20)

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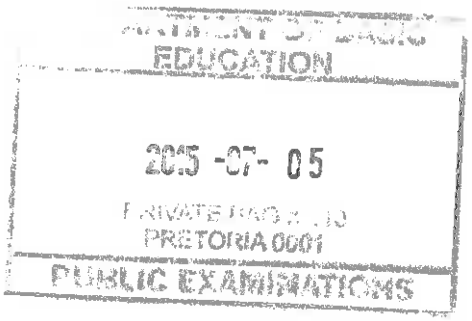
ASSESSING THE PRESENTATION OF THE ESSAY

Criterion	Relevance (R)	Logical sequence (L)	Comprehensive (C)
Generally	All information provided is relevant to the topic	Ideas are arranged in a logical/cause-effect sequence	All aspects required by the essay have been sufficiently addressed
In this essay	Only information regarding mutations and the related to genetic disorders is given. (no irrelevant information).	Information regarding mutations and related genetic disorders are each explained in a logical order.	At least **two** types of mutation; and **two** disorders fully described.
Mark	1	1	1

TOTAL SECTION C: 20
GRAND TOTAL: 150



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