



**LIMPOPO**  
PROVINCIAL GOVERNMENT  
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF  
**EDUCATION**

**VHEMBE EAST DISTRICT**

**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 12**

**LIFE SCIENCES P2  
PRE-TRIAL EXAMINATION 2019  
Memorandum**

**MARKS: 150**

**This memorandum consists of 11 pages including the cover page.**

**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 only the letter is asked for, but only the name is given (and vice versa). Do not credit.
14. If units are not given in measurements. Candidates will lose marks. Memorandum will allocate marks for units separately.
15. Be sensitive to the sense of an answer, which may be stated in a different way.
16. Caption. All illustrations (diagrams, graphs, tables, etc.) must have a caption.
17. 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.

## **SECTION A**

## QUESTION 1

- |     |        |     |
|-----|--------|-----|
| 1.1 | 1.1.1  | C✓✓ |
|     | 1.1.2  | D✓✓ |
|     | 1.1.3  | C✓✓ |
|     | 1.1.4  | A✓✓ |
|     | 1.1.5  | D✓✓ |
|     | 1.1.6  | B✓✓ |
|     | 1.1.7  | A✓✓ |
|     | 1.1.8  | D✓✓ |
|     | 1.1.9  | C✓✓ |
|     | 1.1.10 | C✓✓ |

(10 x 2) **(20)**

- |     |       |                                    |
|-----|-------|------------------------------------|
| 1.2 | 1.2.1 | Heterozygous/Hybrid✓               |
|     | 1.2.2 | Foramen magnum✓                    |
|     | 1.2.3 | Allele ✓                           |
|     | 1.2.4 | Reproductive isolation mechanisms✓ |
|     | 1.2.5 | Sex-linked ✓/X-linked              |
|     | 1.2.6 | Biogeography✓                      |
|     | 1.2.7 | Homologous structures✓             |
|     | 1.2.8 | Hypothesis✓                        |

**(8)**

- |     |       |                |
|-----|-------|----------------|
| 1.3 | 1.3.1 | B✓✓only        |
|     | 1.3.2 | Both A and B✓✓ |
|     | 1.3.3 | Both A and B✓✓ |
|     | 1.3.4 | B✓✓only        |
|     | 1.3.5 | None✓✓         |
|     | 1.3.6 | Both A and B✓✓ |
|     | 1.3.7 | A✓✓only        |

(7 x 2) **(14)**

1.4	1.4.1	(a) wwyy ✓✓	(2)
		(b) WY, Wy ✓✓	(2)
	1.4.2	Pea comb✓, yellow legs✓	(2)
	1.4.3	WwYy✓✓ OR WWYY	(2)
			<b>(8)</b>

**TOTAL SECTION A: 50**

## **SECTION B**

### **QUESTION 2**

2.1.1	Translation✓	(1)
	Ribosome✓	
2.1.2		(1)
2.1.3	(a) Peptide✓ bond	(1)
	(b) Anticodon✓	
	(c) Codon✓	(1)
	(d) GGA✓	(1)
	Transcription✓	
	- DNA unwinds✓	
	- and unzip✓	(1)
	- One DNA strand acts as a template✓ for forming mRNA.	
	- Free nucleotides according to the DNA template✓	
2.1.4	U with A and G and C	any 4
	(a) 1 = Proline✓	
	4 = Glycine✓	

		(b) 5 = CAC✓	(4)
	2.1.5	Over generations/time flies will/will not develop resistance to DDT✓✓	(1)
		Dose of DDT needed to kill 50% of flies ✓	(1)
		- There is a great deal of variation✓ amongst the offspring	(1)
		- Some flies have a characteristic✓/mutation that makes them /resistance to survive the insecticide✓	(13)
2.2	2.2.1	- and some do not✓	
		- and die✓	(2)
		- this is called natural selection✓	
	2.2.2	- The flies that survive reproduce✓	(1)
		- and thus pass on the favourable characteristics/resistance to insecticide to their offspring✓	
	2.2.3	The next generation will therefore have a higher proportion of individuals with the favourable characteristics✓	any 5
			(5)
			(8)
2.3	2.3.1	0,5 mya✓	(1)
	2.3.2	<i>Homo erectus</i> ✓	(1)
	2.3.3	<i>Australopithecus afarensis</i> ✓	(1)
	2.3.4	<i>Homo sapiens</i> ✓	(1)

- 2.3.5 (a) 2✓ (1)
- (b) 5✓ (1)

2.3.6  $1200 - 200✓ = 1\ 000 ✓$  CC (accept 900 to 1 300; 200 to 300) (2)

- 2.3.7
- It accommodate a bigger brain✓ so they could
  - use tools✓/communicate with language
- (2)
- (10)**

2.4

2.4.1

SKULL A	SKULL B
Small canine✓	Large canine✓
Prominent chin✓	No prominent chin✓
No diastema✓/no spaces between teeth	Diastema✓/spaces between teeth
Brow ridge not pronounced ✓	Brow ridge pronounced ✓
No protruding jaw✓	Protruding jaw✓
Face not prognathous✓	Face prognathous✓
Bigger cranium✓	Smaller cranium✓
No cranial ridge across the top of the cranium✓	cranial ridge across the top of the cranium✓

**(Mark first TWO only)**

(4 +1 table)

(5)

Freely rotating arm✓

2.4.2

Rotation around elbow joints✓

Rotation around the wrist✓

Bare fingertips/nails instead of claws✓

Long upper arms✓

Opposable thumbs✓

Five fingers✓

**(Mark first FOUR only)**

Any 4

(4)

**(9)**

**[40]**

### QUESTION 3

- 3.1
- A population of the squirrel species split✓
  - **\*by a geographical barrier/river✓**
  - As a result, the two parts of the population of squirrels cannot interbreed ✓/ no gene flow between the two populations
  - Natural selection occurs independently✓ in each population
  - this is due to different environmental conditions. ✓
  - As a result, the two populations become genotypically and phenotypically different✓ over a period of time
  - Even if the two populations mix at a later stage, they will not be able to interbreed again✓
  - the population have become a new species/speciation.
- This is called speciation✓ **\* 1 compulsory mark + 5**

(6)

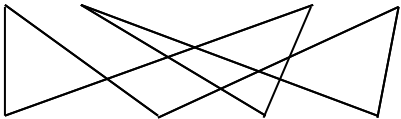
- 3.2 3.2.1
- Large number of eggs produce ✓, therefore improves reliability ✓
  - Simple nutrient medium ✓ therefore reduces costs ✓
  - markings on male/size of female ✓ therefore easy to identify ✓
  - Short generation time ✓ therefore quick results ✓
- (Mark first TWO only)** (any 2 x 2) (4)

3.2.2 **P<sub>1</sub>/parent**

phenotype	White-eye male	x	Red-eyed female✓
genotype	$X^r Y$	x	$X^R X^R$ ✓

*Meiosis*

<b>G/gametes</b>	$X^r, Y$	x	$X^R; X^R$ ✓
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*Fertilisation*

<b>F<sub>1</sub>/offspring</b>	genotype	$X^R X^r; X^R X^r; X^R Y; X^R Y$ ✓
	phenotype	2 Red-eyed females and 2 Red-eyed males✓ <b>*1:1✓</b>

## Meiosis and fertilisation✓

any  $6 + 1^*$

**OR**

<b>P<sub>1</sub>/parent</b>	phenotype	White-eye male	x	Red-eyed female✓
	genotype	X <sup>r</sup> Y	x	X <sup>R</sup> X <sup>R</sup> ✓

## Meiosis

**G/gametes**                       $X^r, Y$     x                       $X^R; X^R \checkmark$

	Gametes	$X^r$	Y
<i>Fertilisation</i>	$X^R$	$X^R X^r$	$X^R Y$
	$X^R$	$X^R X^r$	$X^R Y$
			✓✓

<b>F<sub>1</sub>/offspring</b> phenotype	2 Red-eyed females and 2 Red-eyed males✓ * <b>1:1</b> ✓
--	---

(7)

any 6 + 1\*

- 3.2.3
- Males have one allele ✓
  - so only one recessive allele will show the phenotype ✓
  - but females need two recessive ✓ alleles to show in the phenotype

(3)

(14)

3.3 3.3.1 (a) homozygous dominant✓ or heterozygous✓

(2)

(b) homozygous recessive✓

(1)

- Normal is dominant and the dominant condition ✓

### 3.3.2



- can show up in either homozygous✓
- or heterozygous state✓

OR

- To have a normal child ✓
- the person **O** must have at least one dominant gene✓
- phenotype is normal ✓

(3)  
(6)

- 3.4    3.4.1    Centriole✓ (1)
- 3.4.2    Non disjunction✓ (1)
- 3.4.3    Anaphase 1✓ (1)
- 3.4.4    Chromosomes moving to the poles✓ (1)
- 3.4.5    3✓ (1)
- 3.4.6    Two gametes with 2 chromosomes each ✓  
Two gamete with 4 chromosomes each✓ (2)
- 3.4.7    The zygote will have 7 chromosomes ✓(3+4) instead of 6.  
It will cause an abnormality✓ (Trisomy)  
There will be an extra chromosome present ✓

OR

The zygote will have 5 chromosomes ✓(2+3) instead of 6.  
It will cause an abnormality✓ (Trisomy)  
There will be one less chromosome present ✓

(3)  
(10)

- 3.5    3.5.1    Suspect 1✓ (1)
- 3.5.2    The bars from the evidence correspond with the bars of Suspect 1✓ (1)
- 3.5.3    By repeating ✓the test with the DNA sample several times to make  
sure they get the same results ✓. (2)  
(4)  
[40]

**TOTAL SECTION B:            80**

## SECTION C

### QUESTION 4

#### The development of bipedalism

- The central✓ positioning of the foramen magnum✓ allowed
- bipedal species to walk on two limbs✓
- This allowed a wider view✓ of their surroundings
- Allowing them to search for food✓
- as well as to avoid predators✓
- Their hands were free✓
- to use tools,✓
- prepare food,✓
- carry young✓
- or to hunt or fight✓
- The S-shaped vertebral column✓ allowed for
- an upright posture✓
- which exposed a smaller surface area✓ to the sun
- This reduced the risk of overheating✓ while hunting or escaping from predators
- The larger, shorter and wider pelvic region✓
- supported the greater weight✓ due to bipedalism
- and allowed females to bear children✓
- The upright posture also exposed their gender ✓
- which allowed them to attract the opposite sex✓
- and to the continuation of the species✓

Max 11

#### Features of skull related to diet

- The large teeth, especially the canines✓
- and the large and long jaws✓
- as well as cranial/brow ridges associated with
- large muscles that operate the jaws✓
- indicate that the ape-like beings ate raw food✓ that required a great amount of
- processing✓/tearing, biting and chewing.
- The smaller teeth, including the canines✓
- and the smaller jaw size✓
- as well as the absence of cranial/brow ridges
- due to the presence of smaller muscles for chewing✓
- indicate that modern humans rely on a diet of cooked food✓ that
- does not require the same amount of processing✓/tearing, biting and chewing.

Max 6

Content (17)  
Synthesis (3)  
**(20)**

### ASSESSING THE PRESENTATION OF THE ESSAY

Criterion	Relevance (R)	Logical sequence (L)	Comprehensive (C)
<b>Generally</b>	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
<b>In this essay</b>	Only information relevant to bipedalism and features of the skull as it relate to diet is given	Information regarding bipedalism and features of the skull as it relate to diet is given logical in each	At least <b>six</b> correct points included on bipedalism and <b>four</b> the skull as it relate to diet is given
<b>Mark</b>	1	1	1

**TOTAL SECTION C: 20**

**GRAND TOTAL: 150**