



# Education

KwaZulu-Natal Department of Education  
REPUBLIC OF SOUTH AFRICA

**LIFE SCIENCES-P1**

**PREPARATORY EXAMINATION**

**MEMORANDUM - SEPTEMBER 2019**

**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 12**

**MARKS: 150**

**This memorandum consists of 9 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.

**SECTION A****QUESTION 1**

1.1	1.1.1	A✓✓		
	1.1.2	D✓✓		
	1.1.3	C✓✓		
	1.1.4	C✓✓		
	1.1.5	B✓✓		
	1.1.6	C✓✓		
	1.1.7	D✓✓		
	1.1.8	B✓✓		
	1.1.9	C✓✓		
	1.1.10	D✓✓	(10 x 2)	<b>(20)</b>
1.2	1.2.1	Carbon footprint✓		
	1.2.2	Amniotic✓ egg		
	1.2.3	Fallopian tube✓/oviduct		
	1.2.4	Prostate gland✓		
	1.2.5	Phototropism✓		
	1.2.6	Meninges✓		
	1.2.7	Corpus callosum✓		
	1.2.8	Diploid✓	(8 x 1)	<b>(8)</b>
1.3	1.3.1	Both A and B ✓✓		
	1.3.2	B only✓✓		
	1.3.3	B only✓✓		
	1.3.4	B only✓✓	(4 x 2)	<b>(8)</b>
1.4	1.4.1	Metaphase II✓		(1)
	1.4.2	Crossing over✓		(1)
	1.4.3	(a) Spindle fibre✓		(1)
		(b) Centriole✓		(1)
		(c) Chromatid✓		(1)
		(d) Chromosome✓		(1)
				<b>(6)</b>
1.5	1.5.1	(a) Acrosome✓		(1)
		(b) Nucleus✓		(1)
	1.5.2	B✓		(1)
	1.5.3	(a) A✓ - acrosome✓		(2)
		(b) C✓ - middle piece✓/ neck		(2)
	1.5.4	38✓		(1)
				<b>(8)</b>

**TOTAL SECTION A: 50**

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

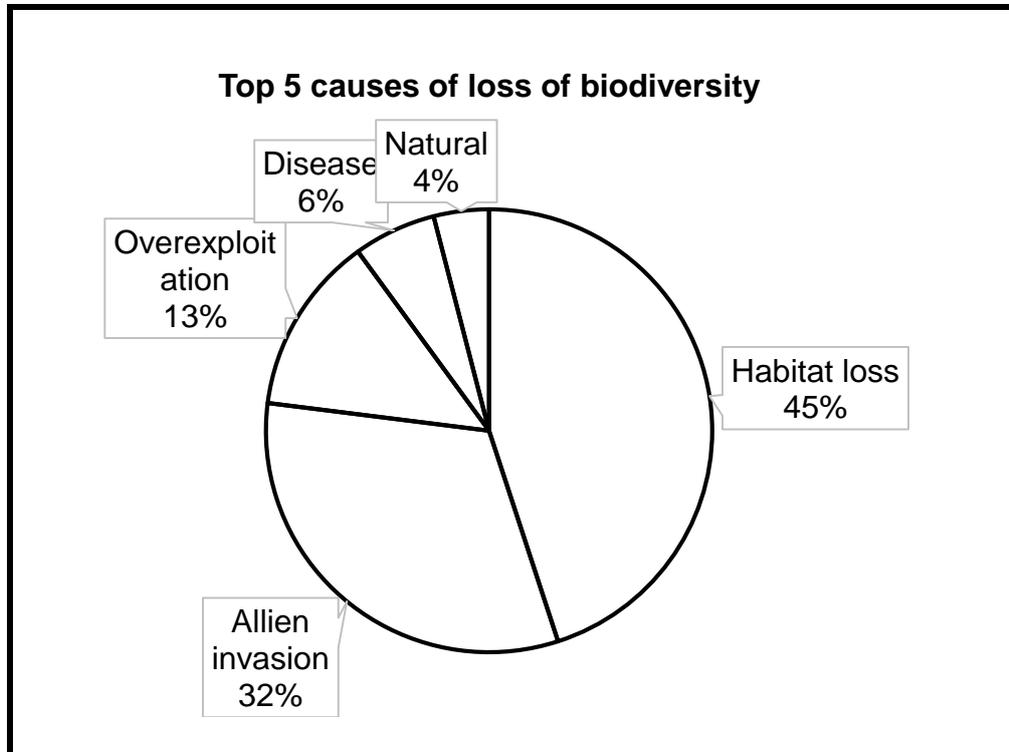
- |     |       |  |                        |
|-----|-------|--|------------------------|
| 2.1 | 2.1.1 | Equalizes pressure between the middle and outer ear✓   | (1)                    |
|     | 2.1.2 | (a) C✓ – Cochlea✓<br>(b) E✓ – Round window✓<br>(c) B✓ – Auditory nerve✓  | (2)<br>(2)<br>(2)      |
|     | 2.1.3 | - Pressure waves will not be converted into an impulse✓<br>- hearing will not occur✓/a person will not hear any sound  | (2)                    |
|     | 2.1.4 | A change in the position of the head:<br>- Stimulates the maculae✓<br>- In the utriculus and sacculus✓<br>- to convert the stimulus into an impulse✓<br>- Impulse is sent to the cerebellum✓<br>- through the auditory nerve✓<br>- Cerebellum sends impulses to the skeletal muscles✓<br>- To restore balance✓   | Any (5)<br><b>(14)</b> |
| 2.2 | 2.2.1 | (a) Cervix✓<br>- Allows flow of menstrual blood✓<br>- Allows passage of sperm cells✓<br>- Encloses uterus during pregnancy✓<br>- Allows for the passage of the foetus ✓  | (1)<br><br>(Any 1) (2) |
|     |       | (b) Chorion✓<br>- Protects the embryo✓<br>- Forms the placenta✓ /forms the chorionic villi/plays a role in Implantation  | (1)<br><br>(Any 1) (2) |
|     | 2.2.2 | - Acts as a shock absorber✓<br>- Regulates temperature✓<br>- Allows free movement of the foetus✓<br>- Prevents desiccation✓/ dehydration of the foetus<br><b>(Mark the first TWO only)</b>   | Any (2)                |
|     | 2.2.3 | - Endometrium will break down✓<br>- causing miscarriage✓   | (2)                    |
|     | 2.2.4 | - Nutrients and oxygen will not be transported to the foetus✓<br>- No growth will occur✓<br>- since there will be no energy produced✓<br>- Waste products (or example urea,CO <sub>2</sub> ) will not be transported back to the placenta✓<br>- and will accumulate in the foetus✓<br>- changing the pH of the foetus✓/increasing toxicity<br>- Foetus will die✓ | Any (4)<br><b>(12)</b> |

- 2.3 - The zygote✓  
- divides by mitosis✓ many times  
- to form a ball of cells✓  
- called the morula✓  
- which then develops into a hollow ball of cells✓  
- called the blastula✓/blastocyst Any (5)
- 2.4 2.4.1 (a) Cerebellum✓ (1)  
(b) Hypothalamus✓ (1)  
(c) Cerebrum✓ (1)  
(d) Cerebrum✓ (1)
- 2.4.2 - Inhibits the secretion of ADH✓  
- Kidney tubules become less permeable to water✓  
- Less water is reabsorbed✓  
- More water is excreted with urine✓ (4)
- 2.4.3 No/less insulin is secreted✓ (1)  
**(9)**  
**(40)**

**QUESTION 3**

- 3.1 3.1.1 Remove the effect of the auxins✓ (1)
- 3.1.2 (a) No growth✓  
- No auxins to stimulate cell elongation✓ (2)
- (b) Stem will grow horizontally✓/no change in direction  
- Auxins are evenly distributed in the stem✓  
- Will cause cell elongation in all parts of the stem✓ (3)
- (c) Stem will grow upwards✓  
- Auxins will accumulate on the lower side✓  
- As they are attracted by gravity✓  
- And stimulate cell elongation on the lower side✓  
- While the upper side grows slowly✓  
Any (4)  
**(10)**
- 3.2 3.2.1 Body temperature✓ (1)
- 3.2.2 - It forms a baseline✓/ acts as a reference point  
- against which results are compared✓. (2)
- 3.2.3 - Learners must be of the same age✓  
- Learners must be of the same gender✓  
- Same fitness level✓  
- Same environmental conditions✓  
- Same measuring tool/thermometer must be used✓  
- The same person must take the measurements✓  
- Learners must be the same mass✓  
- Learners must be the same height ✓  
Any (2)  
**(Mark the first TWO only)**
- 3.2.4 - When running more heat energy is produced✓  
- Which can cause the body temperature to increase✓  
- This stimulate the production of more sweat✓  
- In order to decrease the body temperature through evaporation✓  
Any (3)  
**(8)**
- 3.3 3.3.1 - There will be loss of food✓  
- leading to starvation✓  
OR  
- Loss of shelter  
- can leave animals vulnerable to predators✓  
Any (2)
- 3.3.2 - Ecosystems will be disrupted✓  
- Because food chains will be destroyed✓  
- As the extinct species may cause an increase in the species that it was feeding on✓  
- Or a decrease in the species that fed on it✓  
Any (3)

3.3.3  $45/100 \times 360^\circ = 162^\circ$      $6/100 \times 360^\circ = 22^\circ$   
 $4/100 \times 360^\circ = 14^\circ$      $32/100 \times 360^\circ = 115^\circ$   
 $13/100 \times 360^\circ = 47^\circ$



**Marking grid for the pie chart**

Criteria	Mark allocation
Correct type of graph(Pie chart) (T)	1
Title of graph (including both variables)	1
Calculations (C)	1: 1 to 4 calculations correct 2: All 5 calculations correct
Proportions accurate for each sector/slice labelled (P)	1: 1 to 3 sectors drawn correctly 2: All 5 sectors drawn correctly

(6)  
(11)

- 3.4    3.4.1    Crops whose genes have been altered/changed✓    (1)
- 3.4.2    - good recent rainfalls✓  
- a larger area for planting✓    Any    (2)
- 3.4.3    14,7 – 7,8✓  
= 6,9/7,8 x 100✓  
= 88,46✓%    (3)  
Accept 88,5 %

- 3.4.4 - More maize will be available✓  
- causing a drop in prices✓ (2)
- 3.4.5 - Increased production in maize✓  
- Will result is more exports to other countries in the world✓  
- Causing increased profits✓  
- Increasing the country's economy✓ Any 3  
OR  
- There would be an over production of maize✓  
- Thereby increasing competition✓  
- Reducing prices, decreasing profits✓  
- Leading to the country's economy decreasing✓ Any 3  
OR  
- Reduced production of yellow maize✓  
- Result in less exports✓  
- Causing loss of profit✓  
- Reducing the country's economy✓ Any 3 (3)
- (11)**  
**[40]**
- TOTAL SECTION B: 80**

**SECTION C**

**QUESTION 4**

**Reflex action (R)**

- Pain receptors✓ in the foot
- converted a stimulus ✓
- into an impulse✓
- which is transmitted to the spinal cord✓
- by the sensory neuron✓
- The connector neuron✓ transmit impulses from the sensory neuron
- to the motor neuron✓ which transmitted the impulse
- to the effector✓/ muscles of the leg
- causing them to contract✓
- pulling the foot away✓ from the thorn

Any (7)

**Blood Glucose Levels (G)**

- When blood glucose levels dropped✓
- the pancreas was stimulated✓
- to secrete glucagon✓
- into blood✓
- which stimulated the liver cells✓
- to convert glycogen to glucose✓
- Increasing the glucose levels✓
- needed to produce energy for running✓

Any (6)

**TSH levels (T)**

- To stimulate the secretion of more thyroxin✓
- by the thyroid gland✓
- More thyroxin stimulates an increase in metabolic rate✓
- causing faster production of energy by the cells✓

Any (4)  
Content: (17)  
Synthesis: (3)

**ASSESSING THE PRESENTATION OF THE ESSAY**

Relevance	Logical sequence	Comprehensive
All information provided is relevant to the topic	Ideas arranged in a logical/ cause-effect sequence	Answered all aspects required by the essay
Only information about: - Reflex action - Glucose control - Levels of TSH No irrelevant information is given.	Information about: - Reflex action - Glucose control - Levels of TSH is given in a logical sequence	At least: - Reflex action = <b>5/7</b> - Glucose control = <b>4/6</b> - TSH levels = <b>2/4</b> are obtained
1 mark	1 mark	1 mark

**TOTAL SECTION C: 20**  
**GRAND TOTAL: 150**