Education and Sport Development

Department of Education and Sport Development
Departement van Onderwys en Sportontwikkeling
Lefapha la Thuto le Tlhabololo ya Metshameko
NORTH WEST PROVINCE

NATIONAL SENIOR CERTIFICATE

GRADE 12

LIFE SCIENCES

JUNE 2019

MARKING GUIDELINE

MARKS: 150

This question paper consists of 11 pages.

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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 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 are incorrect, do not credit. If sequence and links becomes 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 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 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 memo discussion meeting.

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14. **If only the letter is asked for, and 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 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 marking memoranda without consulting the provincial internal moderator.

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SECTION A

QUESTION 1

1.1	1.1.1	A✓✓	
	1.1.2	B✓✓	
	1.1.3	A✓✓	
	1.1.4	C✓✓	
	1.1.5	D✓✓	
	1.1.6	A✓✓	
	1.1.7	B✓✓	
	1.1.8	C✓✓	
	1.1.9	B✓✓	
	1.1.10	B✓✓	
			(10 x 2) **(20)**
1.2	1.2.1	Epididymis✓	
	1.2.2	Prolactin✓	
	1.2.3	Altricial development ✓	
	1.2.4	Phenotype✓	
	1.2.5	Albinism✓	
	1.2.6	Amniocentesis✓	
			(6)
1.3	1.3.1	A only✓✓	
	1.3.2	B only✓✓	
	1.3.3	A only✓✓	
			(3 x 2) **(6)**
1.4	1.4.1	(a) Zygote	(1)
		(b) Morula✓	(1)
		(c) Placenta✓	(1)
	1.4.2	(a) Fertilization✓	(1)
		(b) Implantation✓	(1)
	1.4.3	(a) 46✓ /23 pairs	(1)
		(b) 23✓	(1)
			(7)
1.5	1.5.1	Cerebrum✓	(1)
	1.5.2	C✓- Medula oblongata✓	(2)
			(1)
	1.5.3	Connects the two cerebral hemisphere✓/regulates eye movements	(1)
			(2)
	1.5.4	Cerebellum✓	(1)
	1.5.5	Pituitary gland✓/ Hypophysis	(1)
			(6)

1.6	1.6.1	Dihybrid cross✓		(1)
	1.6.2	BbYy✓		(1)
	1.6.3	BY, By, bY, by ✓✓	(Two marks or nothing)	(2)
	1.6.4	25%✓		(1)
				(5)
			TOTAL SECTION A:	**[50]**

QUESTION 2

2.1	2.1.1	(a) 18✓	(1)
		(b) 6✓	(1)
		(c) 6✓	(1)
			(3)
	2.1.2	ACU✓, CCU✓, GAG✓	
	2.1.3	Threonine✓, Proline✓, Glutamine✓	(3)
	2.1.4	Valine✓	(1)
			(10)
2.2	2.2.1	(a) Oestrogen✓	(1)
		(b) Progesterone✓	(1)
	2.2.2	- It increases the thickness of the endometrium✓/ endometrium becomes more vascular and glandular✓	(1)
	2.2.3	(a) Day 14✓	(1)
		(b) LH✓/ Luteinizing hormone	(1)
	2.2.4	- High leves of hormone B(progesterone) will inhibit✓ the secretion of FSH✓/Not enough FSH is secreted. OR -No new ova✓/ no mature follicles are required during pregnancy✓.	(2)
	2.2.5	-The progesterone ✓levels decreased✓	(2)
			(9)
2.3	2.3.1	(a) Light intensity✓	(1)
		(b) Diameter of the pupil✓	(1)
	2.3.2	- Measure the diameter of the same pupil✓/ of the same eye - Use the same instrument to measure the pupil size✓ - The same person should take all measurements✓ Any TWO	(2)
	2.3.3	- Repeat the investigation✓ - Use a larger sample group✓	

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- Take more readings at each light intensity✓

Any ONE (1)

2.3.4 - The circular muscles of the iris relaxed✓
- The radial muscles of the iris contracted✓ (2)

2.3.5 - Diameter of the pupil was smallest/ 2mm✓
- reducing the amount of light entering the eye✓ (2)
(9)

2.4 2.4.1 - C✓ (1)

2.4.2 -The maculae in the utriculus and sacculus✓ provide information about the position of the head in space with respect to gravity✓
-The otolith in the jelly like layer of the maculae respond to gravity✓
-when the position of the head changes, mechanical stimuli are created✓
-They are converted to nerve impulses by the hair cells✓
-The cristae detect changes in speed or movement of the head✓
-As soon as the head turns in one direction, the endolymph in the corresponding canal will move✓
-Moving endolymph creates mechanical stimuli which will be converted to impulses by the sensory hair cells✓
-The nerve impulses are conducted by the vestibular nerve from maculae and crista to the cerebellum ✓ where balance is coordinated.✓ Any five (5)
(6)

2.5.1 - Myelin sheaths are fatty membranes ✓enclosing nerve fibres
-It insulates nerve fibres✓ and accelerates the transmission of nerve fibres (Mark ONE function only) (2)

2.5.2 - Viral infections✓Genetic factors✓environmental stresses✓ (Mark first TWO only) (2)

2.5.3 - Loss of speech✓
- Inability to walk✓
- Numbness in arms/legs✓
- Loss of vision/ double vision✓
- tingling sensation/pain✓
- fatigue/ weakness✓
- loss of memory/mood swings✓

Any TWO (2)
(6)
[40]

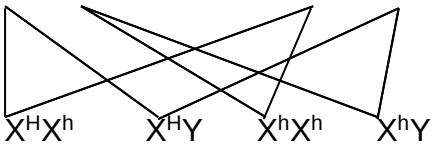
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QUESTION 3

3.1	3.1.1	- Metaphase I✓	(1)
	3.1.2	- Crossing over has taken place✓ - Genetic material was exchanged✓	(2)
	3.1.3	- Anaphase II✓	(1)
	3.1.4	-The spindle fibres contracted✓ -The centromeres split✓ - The chromatids/ daughter chromosomes are pulled to the opposite poles of the cell✓	(3)
	3.1.5	-Testes/ seminiferous tubules✓	(1) **(8)**
3.2	3.2.1	RNA✓	(1)
	3.2.2	It has Uracil as one of the nitrogenous base✓	(1)
	3.2.3	1- Phosphate group✓ 2- Ribose sugar✓ 3 –Adenine✓ 4- Guanine✓	(4)
	3.2.4	Nucleotide✓	(1)
	3.2.5	Hydrogen bond✓	(1)
	3.2.6	Nucleus✓, mitochondria✓, chloroplast✓	(1)
	3.2.7	It is responsible for the protein synthesis✓ It is responsible for the transmission of hereditary characteristics ✓ from one generation to the next.	(1)
	3.2.8	Messenger RNA✓ (mRNA) Ribosomal RNA✓(rRNA) Transfer RNA ✓(tRNA)	(3) **(13)**

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3.3 3.3.1

P_1/parent	Phenotype	Normal female/ female without haemophilia	x	Heamophilic male✓
	Genotype	X^HX^h	x	X^hY✓
		Meiosis		
	G/gametes	X^H ; X^h	x	X^h ; Y ✓
	Fertilisation			
		X^HX^h X^HY X^hX^h X^hY		
F_1offspring	Genotype	X^HX^h X^HY X^hX^h X^hY✓		
	Phenotype	Normal female, Normal male, haemophiliac female , haemophiliac male✓		

Parents and offspring✓/P_1 and F_1
Meiosis and fertilisation✓ **Any 6**

OR

P_1/parent	Phenotype	Normal female	x	Haemophiliac male
	Genotype	X^HX^h	x	X^hY✓
		Meiosis		
	G/gametes		x	

Fertilisation

Gamete	**X^H**	**X^h**
X^h	X^HX^h	X^hX^h
Y	X^HY	X^hY
Correct genotypes ✓✓		

F_1/offspring	Phenotype	Normal female, Normal male, haemophiliac female , haemophiliac male✓ (7)

Parents and offspring✓/P_1 and F_1
Meiosis and fertilisation✓

Any 6 (6)

3.3.2 Haemophilia is controlled by a recessive allele on the X chromosome✓
Males have only one X chromosome ✓and don't have another corresponding allele on their Y chromosome to mask/ hide it ✓
Therefore a male with just one recessive allele ✓will be a sufferer /
Females have 2 X chromosomes so require 2 recessive alleles to sufferer. This is less common. **Any three** (3)
(9)

3.4 3.4.1 (a) Hh✓
(b) Hh✓ (2)

3.4.2 - 4 is HH✓2 is Hh (heterozygous) (1))

3.4.3 - All straight✓ (1)

3.4.4 - No✓, because both males and females have straight and wavy hair✓/
-found on autosomal chromosomes✓ (2)

3.4.5 Transgenic organism is an organism with one or more genes✓ that have been transferred to it from another organism✓
OR
has its genetic material manipulated✓. It got the new genetic material from another organism.✓ (2)

3.4.6 -Production of medication / resources cheap ✓
-Control pests; with specific genes inserted into a crop ✓
-Using specific genes to increase crop yields ✓ / food security
-Select genes to increase shelf-life of plant products. ✓
(Any Two) **Mark first two only** (2)
(10)
[40]

TOTAL FOR SECTION B: 80

SECTION C

QUESTION 4

Mechanism of reflex action

Example: Withdrawal of hand after being pricked by a pin/ Withdrawal of a finger from a hot surface(Any suitable example)✓

-The pain receptors in the skin receive the stimulus✓

-Stimulus is converted into a nerve impulse✓

-The impulse travels along the sensory neuron towards the spinal cord along the dorsal root of the spinal nerve✓

-In the spinal cord, the sensory neuron makes synaptic contact with the connector neuron.✓

-The impulses are transmitted along the motor neuron ✓along the Ventral root of the spinal nerve to the effector organ/ muscle✓

-The muscle contracts and pulls the hand away.✓

-the reflex action provides a quick response to the stimulus to minimise injuries.

Any 8 (8)

Action of Adrenalin

Example: Chased by a ferocious dog✓

-Brain becomes aware of emergency through impulses from the sense Organs.✓

-adrenal glands are stimulated to secrete adrenalin.✓

-Messages are sent to various parts of the body(blood vessels, heart)✓

-Blood vessels of the skin and digestive system constrict

-Blood vessels to the heart muscles, skeletal muscles and vital organs dialate, more blood and oxygen are directed to muscles✓

-The heart rate and breathing rate increase✓

-The conversion of glycogen to glucose is promoted in the liver✓

-Metabolic rate increases, cells get more energy✓

-Muscle tone increases✓

-pupils dilate to allow a rapid response to ensure safety✓

The person can run and escape from the dangerous situation.

Any 9 **(9)**

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 the role of reflex action and adrenalin are discussed	The pathway of reflex action is discussed in the correct sequence.	5/8 for role of reflex action and 6/9 scored for the role of adrenalin.
Mark	1	1	1

TOTAL SECTION C: 20
GRAND TOTAL: 150

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