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 P1

SEPTEMBER 2017

MEMORANDUM

MARKS: 150

This memorandum consists of 13 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 the 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 memorandum 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.

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. The provincial internal moderator must be consulted.

20. **Official memoranda**
Only memorandum distributed by the North West Province, must be used.

SECTION A

QUESTION 1

1.1	1.1.1	A ✓✓		
	1.1.2	D ✓✓		
	1.1.3	B ✓✓		
	1.1.4	C ✓✓		
	1.1.5	D ✓✓		
	1.1.6	A ✓✓		
	1.1.7	A ✓✓		
	1.1.8	C ✓✓		
	1.1.9	B ✓✓		
	1.1.10	B ✓✓	(10 x 2)	**(20)**
1.2	1.2.1	Eutrophication ✓		
	1.2.2	Umbilical cord ✓		
	1.2.3	Reflex Action ✓		
	1.2.4	Telophase II ✓		
	1.2.5	Precocial ✓development		
	1.2.6	Receptor ✓		
	1.2.7	Conjunctiva ✓		
	1.2.8	Corpus callosum ✓		
	1.2.9	Autonomic ✓ nervous system		
	1.2.10	Sustainability ✓	(10 x 1)	**(10)**
1.3	1.3.1	None ✓✓		
	1.3.2	Both A and B ✓✓		
	1.3.3	B only ✓✓		
	1.3.4	A only ✓✓		
	1.3.5	Both A and B ✓✓	(5 x 2)	**(10)**
1.4	1.4.1	C✓ – Medulla Oblongata✓		(2)
	1.4.2	A ✓- Cerebrum✓		(2)
	1.4.3	D✓ - Cerebellum✓		(2) **(6)**
1.5	1.5.1	A - Hypophysis ✓ /Pituitary gland B – Thyroid gland✓		(2)
	1.5.2	1 - TSH✓ 2 - Thyroxin✓		(2) **(4)**
			TOTAL SECTION A:	**50**

SECTION B

QUESTION 2

2.1 2.1.1 10^{-3} ✓ parts per million✓ (2)

2.1.2 - As auxin concentration increases stem growth is stimulated✓
- until a maximum is reached at 10^{-2} parts per million✓
- any further increase decreases growth.✓ (3)

2.1.3 - Greatest inhibition of root growth✓
- affecting supply of water/nutrients✓
- thus decreasing photosynthesis/life processes✓ in the weed (3)

. **(8)**

2.2 - Shell✓ for protection✓/ to prevent dehydration
- Yolk✓/albumin for nutrition✓
- Amniotic fluid✓ to maintain suitable temperature✓/keeps embryo hydrated
- Chorion✓ for gas exchange✓
- Allantois✓ for gaseous exchange✓/excretion (Any 2 x 2) **(4)**

2.3 2.3.1 Homologous chromosomes✓ (1)

2.3.2 2✓ (1)

2.3.3 - In Prophase 1✓
- segments of chromatids of homologous chromosomes✓
- cross over/are exchanged✓and
- will lead to each gamete having a mix of genetic material from both parents.✓ (4)

- During Metaphase I✓/II
- each pair of homologous chromosomes/each chromosome✓
- will line up in different ways/randomly/independent at the equator✓
- thus allowing the gametes to have different combinations of maternal and paternal chromosomes.✓ (Any 3) (7)

(9)

2.4 2.4.1 Mercury✓ (1)

2.4.2 - Increase awareness✓
- Decrease the use of fertilisers✓
- Provide incentive✓
- Reduce industries✓/industrial development
- Prevent the release of metals in the water✓
- Institute penalties ✓ (Any 2) (2)

2.4.3 - Humans occupy higher trophic levels✓
- feeding on many freshwater organisms✓/fish that have the metals
- allowing the concentration of these metals to accumulate✓/exceed the limit for humans (3)

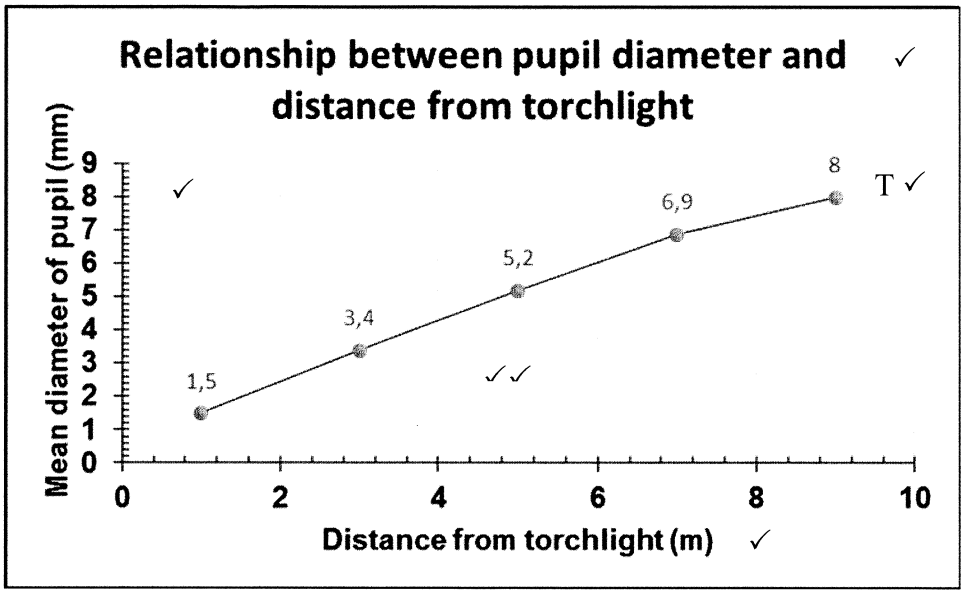
(6)

2.5	2.5.1	Adrenalin✓	(1)
	2.5.2	- Adrenal gland✓ - carried by the blood✓/ diffuses out of blood capillaries to the cells	(2)
	2.5.3	Sympathetic nervous system✓	(1)
	2.5.4	- Converts stored glycogen to glucose✓ - which is released in the blood stream✓ - to be used as a source of energy for cellular respiration✓	(3) **(7)**
2.6	2.6.1	**Advantage** - No chemicals involved✓ - so no pollution of the environment✓ **Disadvantage** - The introduced organism could become so successful✓ - that it could eliminate other species✓/disrupt food chains. (2 x 2)	(4)
	2.6.2	- Reducing of waste✓ - Re-using of waste products✓	(2) **(6)** **[40]**

QUESTION 3

3.1	3.1.1	Hypothalamus✓	(1)
	3.1.2	10 minutes ✓	(1)
	3.1.3	Diagram I ✓	(1)
	3.1.4	- The body temperature is increased above normal✓ - Blood vessels dilated✓/vasodilation occurred - to bring more blood to the surface✓ - so that more heat is lost✓ - allowing the body temperature to drop to normal✓	(5) **(8)**
3.2	3.2.1	- As the light intensity decreases✓ - the pupil diameter increases✓ - At low light intensities more light is required✓ - to form a clear image✓ - and at high light intensities the amount of light must be reduced✓ - to prevent damage to the retina✓ (Any 5)	(5)
	3.2.2	- The larger the sample size ✓ - the more reliable the results✓	(2)

3.2.3



RUBRIC FOR MARKING GRAPH

Correct type of graph	1
Caption for the graph	1
Scale X- and Y- axis	1
Label and units X- and Y- axis	1
Plotting of points	1: 1 to 4 points plotted correctly 2: All 5 points plotted correctly

NOTE: If axes are transposed, marks will be lost only for labelling of X-axis and Y-axis. (6)
(13)

3.3 3.3.1 Nucleus✓ (1)

3.3.2 Mitochondria✓: supplies energy for locomotion of the sperm cell✓

Tail✓: can propel forward for swimming✓/locomotion of the sperm cell

Acrosome✓: contains enzymes that break down the membrane of the ovum✓ (Any 2 x 2) (4)
(5)

3.4 3.4.1
- Appropriate for their age✓
- Their amount of activity✓
- Stage of life✓
- and culture✓/religion (Any 2) (2)

3.4.2
- Practice birth control✓/have fewer children/small family
- Don't waste food✓
- Grow own vegetables in the garden✓/vacant land
- Plant genetically engineered crops for improved yield✓
- Use less herbicides✓/pesticides
- Reduce alien plants on agricultural land✓ (Any 4) (4)
(6)

3.5 3.5.1 To equalise pressure on both sides of the tympanic membrane✓ (1)

3.5.2
- The oval window vibrates ✓
- Pressure waves are set up in the cochlea ✓
- stimulating the organ of Corti ✓
- which converts the stimulus into a nerve impulse✓
- which is then transmitted by the auditory nerve✓
- to the cerebrum✓ (Any 4) (4)

3.5.3
- The plug will disturb the free movement of air✓
- vibration of the tympanic membrane will be less.✓
- Weaker sound waves will be transferred to the inner ear✓
- and hearing will be impaired. ✓ (Any 3) (3)

(8)
[40]

TOTAL SECTION B: 80

SECTION C

QUESTION 4

- The menstrual cycle is a series of events that occur in the female body to prepare it for possible pregnancy✓
- Which involves ovarian cycle✓
- and the uterine cycle✓
- It takes an average of 28 days✓
- The pituitary gland✓/hypophysis
- secretes **FSH**✓
- which stimulates the development of a primary follicle✓ in the ovary
- The developing follicle✓/Graafian follicle
- secretes **oestrogen**✓
- which stimulates the thickening of the lining of the uterus✓/endometrium
- Around day 13 pituitary gland✓/hypophysis
- secretes **LH**✓
- which cause ovulation to occur✓
- Under the influence of **LH**✓
- the remains of the Graafian follicle develops into the corpus luteum✓
- which secretes the **progesterone**✓
- which continues to stimulate the thickening of the uterus✓
- High levels of **progesterone**✓
- inhibits the production of **FSH**✓
- so that the ovaries are no longer stimulated to produce another ovum✓
- If fertilisation does not occur, the corpus luteum degenerates✓
- and stops producing **progesterone**✓
- The pituitary gland/hypophysis is no longer inhibited in its production of **FSH**✓
- and a new follicle develops✓
- The thick endometrium is no longer maintained✓/ it degenerates
- and is shed together with blood ✓/menstruation takes place (Any 17)

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

ASSESSING THE PRESENTATION OF THE ESSAY

Relevance (R)	**Logical sequence (L)**	**Comprehensive (C)**
All information provided is relevant to the question.	Ideas are arranged in a logical sequence.	All aspects of the essay have been sufficiently addressed.
Only information relevant to the menstrual cycle or the role of hormones during the menstrual cycle is given. (There is no irrelevant information)	The description of the events of the menstrual cycle are presented in a logical manner and the hormones linked to the appropriate events	At least the names of all **FOUR hormones** must be mentioned, together with the **gland** that secretes them and the **function** of the hormone: - 4 x 3 = 12 - Use keys F, L, O and P to track the hormone, gland and function to allocate mark correctly.
1 mark	**1 mark**	**1 mark**

TOTAL SECTION C: 20
GRAND TOTAL: 150

LIFE SCIENCES PAPER 1 SEPTEMBER 2017 : QUESTION ANALYSIS GRID

QUEST	COGNITIVE LEVELS				SA1	SA2	SA3	KNOWLEDGE AREA								
	A	B	C	D				Meiosis	Reproduction: vertebrates	Human reproduction	Responding: Humans	Human endocrine system	Homeostasis in humans	Responding: Plants	Human impact on the environment	Totals
1.1.1	2												2			2
1.1.2		2							2							2
1.1.3	2									2						2
1.1.4		2													2	2
1.1.5		2									2					2
1.1.6	2										2					2
1.1.7		2						2								2
1.1.8		2													2	2
1.1.9	2													2		2
1.1.10			2									2				2
	8	**10**	**2**	**0**				**2**	**2**	**2**	**4**	**2**	**2**	**2**	**4**	**20**
1.2.1	1														1	1
1.2.2	1									1						1
1.2.3	1										1					1
1.2.4	1							1								1
1.2.5	1								1							1
1.2.6	1										1					1
1.2.7	1										1					1
1.2.8	1										1					1
1.2.9	1										1					1
1.2.10	1														1	1
	10	**0**	**0**	**0**				**1**	**1**	**1**	**5**	**0**	**0**	**0**	**2**	**10**
1.3.1		2								2						2
1.3.2		2									2					2
1.3.3		2									2					2
1.3.4		2										2				2
1.3.5		2								2						2
	0	**10**	**0**	**0**				**0**	**0**	**4**	**4**	**2**	**0**	**0**	**0**	**10**

1.4.1	1	1									2					2
1.4.2	1	1									2					2
1.4.3	1	1									2					2
	3	**3**	**0**	**0**				**0**	**0**	**0**	**6**	**0**	**0**	**0**	**0**	**6**
1.5.1	2											2				2
1.5.2		2										2				2
	2	**2**	**0**	**0**				**0**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**4**
Quest 1	**23**	**25**	**2**	**0**	**0**	**0**	**0**	**3**	**3**	**7**	**19**	**8**	**2**	**2**	**6**	**50**

	A	**B**	**C**	**D**	**SA1**	**SA2**	**SA3**	**Meiosis**	**Reproduction: vertebrates**	**Human reproduction**	**Responding: Humans**	**Human endocrine system**	**Homeostasis in humans**	**Responding: Plants**	**Human impact on the environment**	
2.1.1		2												2		2
2.1.2				3										3		3
2.1.3				3										3		3
	0	**2**	**0**	**6**				**0**	**0**	**0**	**0**	**0**	**0**	**8**	**0**	**8**
2.2			4						4							4
	0	0	4	0				0	4	0	0	0	0	0	0	4
2.3.1	1							1								1
2.3.2		1						1								1
2.3.3	7							7								7
	8	1	0	0				9	0	0	0	0	0	0	0	9
2.4.1		1													1	1
2.4.2				2											2	2
2.4.3			3												3	3
	0	1	3	2				0	0	0	0	0	0	0	6	6
2.5.1	1											1				1
2.5.2		2										2				2
2.5.3	1										1					1
2.5.4			3									3				3
	2	2	3	0				0	0	0	1	6	0	0	0	7

2.6	2		4												6	**6**
	2	0	4	0				0	0	0	0	0	0	0	6	**6**
Quest 2	**12**	**6**	**14**	**8**	**0**	**0**	**0**	**9**	**4**	**0**	**1**	**6**	**0**	**8**	**12**	**40**
					SA 1	**SA 2**	**SA 3**	**Meiosis**	**Reproduction: vertebrates**	**Human reproduction**	**Responding: Humans**	**Human endocrine system**	**Homeostasis in humans**	**Responding: Plants**	**Human impact on the environment**	
3.1.1	1												1			1
3.1.2		1											1			1
3.1.3		1											1			1
3.1.4				5									5			5
	1	2	0	5				0	0	0	0	0	8	0	0	8
3.2.1				5							5					5
3.2.2			2								2					2
3.2.3	1	4	1								6					6
	1	4	3	5				0	0	0	13	0	0	0	0	13
					SA 1	**SA 2**	**SA 3**	**Meiosis**	**Reproduction: vertebrates**	**Human reproduction**	**Responding: Humans**	**Human endocrine system**	**Homeostasis in humans**	**Responding: Plants**	**Human impact on the environment**	
3.3.1	1									1						1
3.3.2			4							4						4
	1		4	0				0	0	5	0	0	0	0	0	5
3.4.1			2												2	2
3.4.2			4												4	4
	0	0	6	0				0	0	0	0	0	0	0	6	6
3.5.1		1									1					1
3.5.2	4										4					4
3.5.3				3							3					3
	4	1	0	3				0	0	0	8	0	0	0	0	8
Total	7	7	13	13				0	0	5	21	0	8	0	6	40
Q.4	**17**			**3**						**20**						20

SUMMARY																
	A	B	C	D	SA1	SA2	SA 3	Meiosis	Reproduction: vertebrates	Human reproduction	Responding: Humans	Human endocrine system	Homeostasis in humans	Responding: Plants	Human impact on the environment	Total
Quest 1	**23**	**25**	**2**	**0**				**3**	**3**	**7**	**19**	**8**	**2**	**2**	**6**	**50**
Quest 2	**12**	**6**	**14**	**8**				**9**	**4**	**0**	**1**	**6**	**0**	**8**	**12**	**40**
Quest 3	7	7	13	13				0	0	5	21	0	8	0	6	**40**
Quest 4	17	0	0	3				0	0	20	0	0	0	0	0	**20**
Total	59	38	29	24				12	7	32	41	14	10	10	24	**150**
Norm	**60**	**38**	**30**	**22**				**11**	**6**	**31**	**40**	**15**	**11**	**11**	**25**	150