GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

PREPARATORY EXAMINATION

2017

MARKING GUIDELINES

LIFE SCIENCES (FIRST PAPER) (10831)

11 pages

GAUTENG DEPARTMENT OF EDUCATION

PREPARATORY EXAMINATION

LIFE SCIENCES
(First Paper)

MEMORANDUM

PRINCIPLES RELATING TO THE MARKING OF LIFE SCIENCES

1. **If more information than marks allocated is given**
   Stop marking when maximum mark 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 become correct again, resume credit.
9. **Non-recognized 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 recognizable 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 National memo discussion meeting.
14. **If only letter is asked for and only name is given (and vice versa)**
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 captions.
18. **Code-switching of official languages (terms and concepts)**
    A single word or two that appears 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 may be made to the ratified memorandum without consultation with the Provincial Internal Moderator.

SECTION A

QUESTION 1

1.1

1.1.1 C ✓✓
1.1.2 D ✓✓
1.1.3 B ✓✓
1.1.4 C ✓✓
1.1.5 B ✓✓
1.1.6 A✓✓
1.1.7 A ✓✓

(7x2) **(14)**

1.2

1.2.1 Gibberellins✓
1.2.2 Fallopian tube✓
1.2.3 Gestation✓
1.2.4 Umbilical chord✓
1.2.5 Epididymis✓
1.2.6 ADH✓
1.2.7 Aldosterone✓
1.2.8 Embryo✓
1.2.9 Implantation✓

(9x1) **(9)**

1.3

1.3.1 A only ✓✓
1.3.2 B only ✓✓
1.3.3 A only ✓✓
1.3.4 Both A and B✓✓

(4x2) **(8)**

1.4 1.4.1 (a) F✓ (1)
(b) A✓ (1)

1.4.2 (a) Plays a role in informing the cerebellum about movement of the head ✓ / balance (1)
(b) It controls all voluntary actions✓
It receives and interprets all sensations✓ viz. sight, hearing, smell, taste.
It controls all higher thought processes✓ such as memory, judgement, and reasoning. Any 1 (1)

1.4.3 (a) Pituitary gland✓ (1)
(b) LH✓ / luteinising hormone (1)
(6)

1.5

1.5.1	(a)	Spindle fibres✓	(1)
	(b)	Centromere✓	(1)
	(c)	Centriole✓	(1)
			(1)
1.5.2	(a)	Metaphase II✓	(1)
	(b)	Anaphase I✓	(1)
1.5.3	4✓		(1)
1.5.4	Crossing over✓		(1)
1.5.5	2✓		(1)
1.5.6	Metaphase I✓		(1)
1.5.7	• Reduces the number of chromosomes by half✓ which results in the formation of gametes • Ensures that chromosome number remains constant within species✓		(2)
1.5.8	(a)	Ovaries✓	(1)
	(b)	Testes✓	(1)
			(13)

TOTAL SECTION A: 50

SECTION B
QUESTION 2

2.1 2.1.1 Day 14✓ (1)

2.1.2 There is an marked increase ✓ in LH levels in the blood ✓ from day 12 to 14 (2)

2.1.3 There is a developing / growing follicle ✓ in the ovary which is secreting the oestrogen ✓ causing the increasing levels (2)

2.1.4
– Oestrogen causes the endometrium ✓ / lining of the uterus
– to become thicker and more vascular ✓
– in preparation for implantation of the zygote ✓
any 2 (2)

2.1.5 (a) No ✓ (1)

(b) - The progesterone level has dropped.✓ This means that the corpus luteum has degenerated ✓
- FSH levels begin to rise✓ as progesterone is no longer inhibiting secretion ✓
(Mark first ONE only) Any 1x2 (2)
(10)

2.2 2.2.1 The enzymes secreted by the acrosome digest the outer coat of the ovum ✓ (1)

2.2.2 Tail ✓ / flagellum (1)

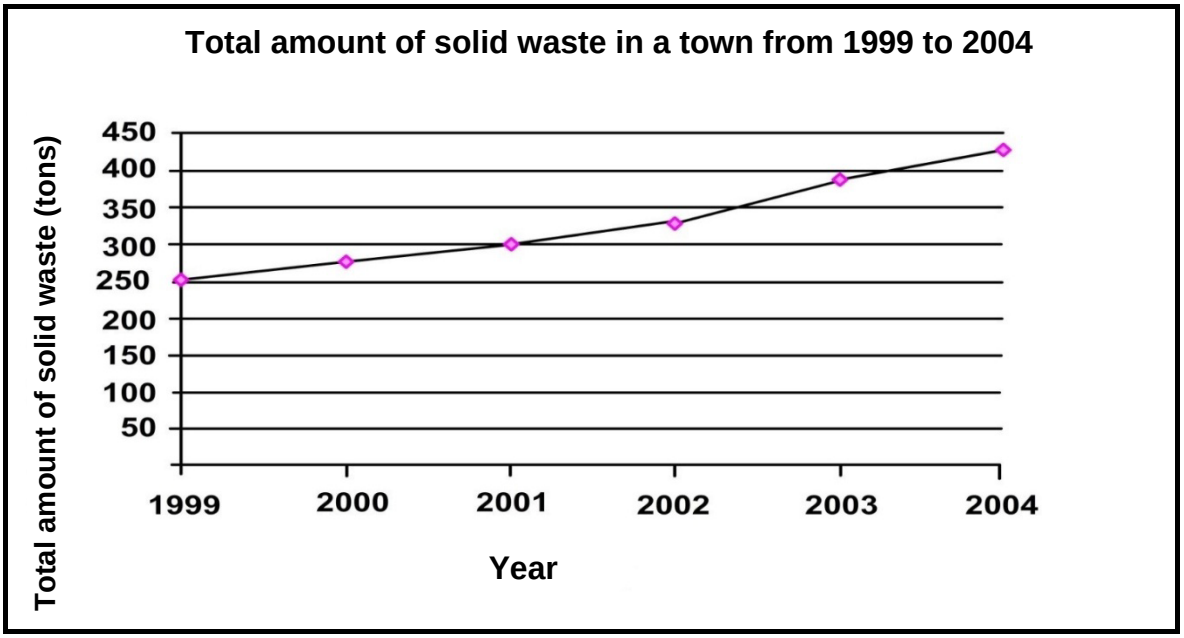
2.2.3
– the tail is very long ✓
– to create wavelike movement✓
– and propel the sperm ✓ through seminal fluid
Any 2 (2)

2.2.4
– Mitochondrion ✓
– Provides energy to the spermatozoa✓ to swim to reach the ovum (2)

2.2.5
– accessory organs✓ / prostate
– produce alkaline fluid✓ to neutralize acids in urine (2)

2.2.6 35^{o}C✓ / 2^{o}C lower than body temperature (1)
(9)

2.3 2.3.1



Criterion	Elaboration	Mark
Type of graph	Line graph drawn	1
Caption	Includes both variables	1
X-axis	Correct label and units and correct scale	1
Y-axis	Correct label and units and correct scale	1
Plotting of points	1 mark: 1 – 4 points plotted correctly 2 marks: All 6 points plotted correctly	2

(6)

2.3.2 388 – 300 ✓= 88✓ tons✓ (3)

2.3.3
- **Construction of more landfills**✓– Could create a negative impact on the environment✓ / land pollution / seepage into groundwater
- **Recycling of materials such as glass, plastic, metal**✓ Decrease pollution of the environment✓
- **Combustion of waste**✓– Positive on land pollution, but negative on air pollution✓
- **Composting of organic matter**✓– increases the fertility of the soil
- **Providing incentives to the public to recycle their rubbish**✓– reduces pollution✓

(Mark first TWO only) Any 2x2 (4)
(One mark for strategy, and one mark for impact)

(13)

2.4 2.4.1
- Excess CO_2 leads to global warming✓
- because of the enhanced greenhouse effect✓
- global warming could cause drought and floods / changes in weather patterns ✓ (3)

2.4.2
- **Availability**
- Alien invasive plants may use water excessively✓
- and thus reduce the amount of water available for the natural vegetation✓ of an area

(2)

- **Quality**
- Alien invasive water plants causes eutrophication✓,
- blocking the waterways, reducing light to other aquatic plants✓.
- These plants eventually die and decompose✓.
- Bacteria that decompose these plants eventually depletes the oxygen supply in the water✓,
- causing other plants and animals to die / suffocate. ✓
- decreasing the quality✓ of water

Any (3)
(8)
(40)

QUESTION 3

3.1 3.1.1 I✓ – fovea centralis ✓ / yellow spot (2)

3.1.2 Light has to pass through **B,** the cornea✓, **C** the pupil✓ and **G**, the lens✓ before reaching **H** , the retina.
(The learner must give the name and letter for each structure to get the mark.) (3)

3.1.3
– **E** / the ciliary muscles relax ✓
– ciliary body goes back to normal position✓ / moves backwards
– tension on **J** / the suspensory ligaments✓
– increases✓
– causing them to become taut✓ / tight
– thereby pulling on **G** / the lens✓
– **G** / the lens becomes flattened / less convex / less round ✓
– causing the refractive power of **G** / the lens is decreased✓
– and a clear image of the distant object / bird is formed on the
– retina ✓

Any (7)
(12)

3.2 3.2.1 A mechanism in the human body that detects changes✓ or imbalances in the internal environment and restores the balance✓ (2)

3.2.2
– Thyroxin levels increases above normal limits causing the pituitary gland to produce less TSH✓
– Low levels of TSH✓ inhibits stimulation✓
– of the thyroid gland✓
– The thyroid gland secretes less thyroxin✓
– The thyroxin level thus decreases✓ in the blood
– Thyroxin returns to normal✓ Any (5)
(7)

3.3 3.3.1 Cold environmental conditions✓ (1)

3.3.2
– blood vessels are dilated✓
– to increase blood flow to the skin surface ✓
– so that more heat is lost from the blood through radiation ✓ (3)
(4)

3.4 3.4.1 Between 07:00 – 08:00✓. (1)

3.4.2 93 mg / 100ml✓ (accept range 92 – 94) (1)

3.4.3
- After a meal or during digestion, glucose is absorbed into the blood / blood glucose levels increase ✓
- Insulin released by pancreas, insulin levels increase✓
- Stimulates the conversion of excess glucose✓ into glycogen✓
- which is stored in the liver / muscles ✓
- stimulates the body cells to use glucose for cellular respiration✓
- This helps to drop raised blood glucose levels after a meal✓

Any 4 (4)

3.4.4 Insulin levels will not rise after a meal / would stay the same and would remain relatively low✓. (1)
(7)

3.5 3.5.1 (a) the effect of the force of gravity✓ (1)

(b) the direction of growth of young roots ✓ (1)

3.5.2
- Same species of seedlings ✓
- Same temperature ✓
- Same light conditions ✓
- Same age of seedlings ✓
- Same amount of water ✓
- Place in the same place ✓

(mark first TWO only) Any 2 (2)

3.5.3
- Repeat the investigation✓
- Increase the sample size✓ / use more than 6 seedlings

(mark first ONE only) Any 1 (1)

3.5.4
- To remove the effect of gravity ✓
- on the direction of growth of young roots ✓ (2)

3.5.5 Radicles in apparatus **B** bend ✓ and grow towards gravity. ✓ (1)

3.5.6 The force of gravity✓ has an effect on the direction of growth of young roots. ✓ (2)
(10)
(40)

TOTAL SECTION B: 80

SECTION C
QUESTION 4

Reflex action

- Pain receptors in the skin of his foot become stimulated✓
- They convert the stimulus of pain into an impulse✓
- which is then transmitted by the sensory neuron✓
- through the dorsal root of the spinal nerve✓
- into the spinal cord✓
- Synaptic contact is made✓
- with the interneuron✓
- and then with the motor neuron.✓
- An impulse is then transmitted by the motor neuron via the ventral root✓
- of the spinal nerve✓
- to the effector organ / muscle✓
- which contracts to withdraw his foot. ✓

Max 8

Balance

- The cristae ✓
- found in the ampulla ✓
- at the base of the semi-circular canals ✓
- are stimulated by the change in direction and speed of the head.✓
- The maculae ✓
- in the utriculus ✓
- and sacculus ✓
- are stimulated by the change in the position of the head.✓
- Impulses are generated ✓
- and transmitted via the auditory nerve✓
- to the cerebellum✓ which also
- sends impulses to the muscles✓
- enabling the person to maintain balance and body position.✓

Max 9
Content: (17)
Synthesis**:** (3)
(20)

ASSESSMENT OF 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 relevant to the reflex arch and balance is given. (There is no irrelevant information.)	Generally each action is appropriately linked to the reflex action as well as how the person managed to maintain balance and body position with ideas arranged in a **logical sequence.**	The reflex action that takes place as well as how the person managed to maintain balance and body position is described. Reflex action 5 / 7 and balance 7 / 9
Mark	R✓	L✓	C✓

TOTAL SECTION C: 20

TOTAL: 150