LIFE SCIENCES P1
NOVEMBER 2017
MARKING GUIDELINES

MARKS: 150

These marking guidelines consist of 11 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.

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 without consulting the provincial internal moderator who in turn will consult with the national internal moderator (and the Umalusi moderators where necessary).

20. **Official memoranda**  
Only memoranda bearing the signatures of the national internal moderator and the Umalusi moderators and distributed by the National Department of Basic Education via the provinces must be used.
SECTION A

QUESTION 1

1.1
1.1.1 D✓✓
1.1.2 B✓✓
1.1.3 D✓✓
1.1.4 A✓✓
1.1.5 C✓✓
1.1.6 C✓✓
1.1.7 D✓✓
1.1.8 B✓✓
1.1.9 B✓✓
1.1.10 D✓✓ (10 x 2) (20)

1.2
1.2.1 External✓ fertilisation
1.2.2 Chiasma✓
1.2.3 Aldosterone✓
1.2.4 Homeostasis✓
1.2.5 Amniotic✓ egg
1.2.6 Luteinising hormone✓/LH
1.2.7 Astigmatism✓
1.2.8 Corpus callosum✓
1.2.9 Optic✓ nerve
1.2.10 Meninges✓ (10)

1.3
1.3.1 None✓✓ (2)
1.3.2 B only✓✓ (2)
1.3.3 A only✓✓ (2)

(3 x 2) (6)

1.4
1.4.1 Motor✓ neuron (1)
1.4.2 (a) Nucleus✓/nuclear membrane (1)
(b) Cytoplasm✓ (1)
(c) Dendrite✓ (1)
1.4.3 (a) C✓ - Axon✓ (2)
(b) D✓ - Myelin sheath✓ (2)
1.4.4 Multiple sclerosis✓ (1)

(9)

1.5
1.5.1 Pancreas✓ (1)
1.5.2 Insulin✓ (1)
1.5.3 Glucagon✓ (1)
1.5.4 Diabetes✓ mellitus (1)
1.5.5 Negative feedback✓ (1)

(5)

TOTAL SECTION A: 50
SECTION B

QUESTION 2

2.1 2.1.1 Northern Cape ✓ (1)

2.1.2 Eastern Cape ✓ (1)

2.1.3 74,72 OR 74,7 OR 75 ✓ ✓ ✓ % (3)

OR (if candidate does not have above answer)

\[ \frac{33,4}{78,1-44,7} \times 100 \] ✓ Max (2)

2.1.4 - Western Cape ✓ and
- KwaZulu-Natal ✓ (2)

(MARK FIRST TWO ONLY)

2.1.5 - Research alternative methods ✓ e.g. desalinate seawater/cloud seeding to supplement the normal water supplies ✓

- Fix/maintain all waterworks ✓/pipe systems to prevent water loss by leaking ✓

- Locate aquifers ✓/boreholes/underground water to provide additional water sources ✓

- Penalise people who are using too much water ✓ to prevent them from wasting water ✓

- Remove alien plants ✓ in the catchment area of the dam to ensure that more water reaches the dams ✓

- Increase awareness ✓ to encourage wise water use ✓

- Offer water tanks at a reduced price ✓ to create additional source of water ✓

- Recycle grey water ✓ to provide additional water sources ✓

- Build dams ✓ to store water ✓ (Any 2 x 2) (4)

(MARK FIRST TWO ONLY)
2.1.6  
- Habitats are destroyed ✓
  which will lead to a loss in biodiversity ✓
- When flood gates are opened flooding may occur in the areas downstream from the dam ✓
  resulting in erosion ✓ / loss of top soil / loss of lives / loss of biodiversity
- The river downstream from the dam will receive less water ✓
  which may have a negative impact on aquatic ecosystems ✓ / lead to biodiversity loss
- Wall blocks fish migration ✓
  decreasing spawning ✓ / reproduction / survival
- Dam wall restricts movement of organisms ✓
  affecting food chains / webs ✓

(MARK FIRST TWO ONLY)

(Any 2 x 2) (4)

2.2  
2.2.1  
- Food security refers to the access by all people ✓
  at all times ✓
  to adequate ✓ / safe / nutritious food

(Any 2) (2)

2.2.2  
- 'endemic to North and South America' ✓
- 'the armyworm reached Africa' ✓
- 'Invasion of Spodoptera' ✓

(MARK FIRST ONE ONLY)

(Any 1) (1)

2.2.3  
- Maize imports ✓
- High altitude wind streams ✓

OR
- Eggs ✓
- Moths ✓

(MARK FIRST TWO ONLY)

(2)

2.2.4 Chemical ✓ control

(1)

2.2.5  
- The armyworm may lead to crop failure ✓ / food shortages that will mean financial / job losses ✓ for farmers
- Food shortages ✓ / maize will have to be imported that will cause increase in food prices ✓
- Using pesticides could adversely influence other crops ✓
  that will cause increase in food prices ✓
- Using pesticides is expensive ✓ and
  will lead to increased food prices ✓

(MARK FIRST ONE ONLY)

(Any 1 x 2) (2)

(Any 1 x 2) (8)
2.3  2.3.1  Telophase II✓  (1)

2.3.2  - There are 4 cells✓
- Each cell contains only a single set of un-replicated✓/single stranded chromosomes  (2)
(MARK FIRST TWO ONLY)

2.3.3  (a)  Two/2✓  (1)
(b)  Four✓/4/2 pairs  (1)

2.3.4  (a)  - Crossing over✓
- Random arrangement✓ of chromosomes on the equator  (2)
(MARK FIRST TWO ONLY)

(b)  - The gametes that form will be genetically different✓
- leading to variation in the offspring✓/increasing the gene pool
- This increases a species chances of survival✓  (3)
(10)

2.4  2.4.1  (a)  Chorion✓/Amnion  (1)

(b)  Umbilical cord✓  (1)

2.4.2  - Protects the foetus from shock✓/Acts as a shock absorber
- Protects the foetus from drying out✓
- Protects the foetus from temperature changes✓
- Allows free movement of the foetus✓  (Any 2)  (2)
(MARK FIRST TWO ONLY)

2.4.3  - Gaseous exchange system✓
- Excretory system✓
- Digestive system✓  (Any 1)  (1)
(MARK FIRST ONE ONLY)

2.4.4  - The foetus will receive less nutrients✓
and therefore have a lower birth mass✓/physical under-development/mental under-development

- The foetus will receive less oxygen✓
and therefore have a lower birth mass✓/physical under-development/mental under-development

- Waste will accumulate✓
and it will affect the functioning of the foetus✓  (A 2)
(MARK FIRST ONE ONLY)
QUESTION 3

3.1  3.1.1 - The growth of a plant\checkmark/part of a plant
- in response to a stimulus\checkmark  (2)

3.1.2

![Diagram of seedling after 1 week]

Checklist for marking the diagram:

<table>
<thead>
<tr>
<th>Description</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caption</td>
<td>(1)</td>
</tr>
<tr>
<td>Correct drawing:</td>
<td></td>
</tr>
<tr>
<td>Radicle growing downwards</td>
<td>(1)</td>
</tr>
<tr>
<td>Plumule growing upwards</td>
<td>(1)</td>
</tr>
<tr>
<td>ONE correct label: Plumule/radicle/germinating seed</td>
<td>(1)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>(4)</td>
</tr>
</tbody>
</table>

3.2  3.2.1 Tip of the stem\checkmark/tip of root/apical meristem/terminal bud/apical bud  (1)

3.2.2  - The stem grows\checkmark/bends
- towards the light\checkmark  (4)

3.3  3.3.1 - Group A\checkmark
- Group C\checkmark  (2)

3.3.2  (a) Amount of Thyroxin\checkmark  (1)

(b) Metabolic rate\checkmark
   By measuring the change in mass\checkmark/consumption of oxygen  (2)

3.3.3  Z, X, Y \checkmark\checkmark  (2)
3.3.4 Group B ✓

3.3.5 - The mass of the rats decreased ✓/changed from 320 g to 309 g
- since body fat is used ✓/less fat is stored
- The oxygen consumption was the highest ✓/(10ml/kg/min)
- indicating an increased rate of metabolism ✓/respiration
- which is caused by the higher thyroxin concentration ✓
- Diet Y is the only diet that contained thyroxin ✓/group B receives thyroxin through diet Y ✓

(Any 5) (5)

3.3.6 - The age of the rats must be the same ✓
- All the rats must receive the same amount of food ✓
- Food must be given at the same time ✓
- The rats must be of the same species ✓/genetically similar
- Use the same instrument to measure mass ✓
- The same person must take the measurements ✓
- Use identical cages ✓

(Any 3) (3)

(MARK FIRST THREE ONLY) (16)

3.4 3.4.1 (a) Auditory nerve ✓

(b) Round window ✓/Fenestra rotunda

3.4.2 Cerebrum ✓

3.4.3 - The cristae ✓/in the semi-circular canals
- are stimulated by changes in speed and direction ✓
- when the endolymph moves ✓
- The cristae convert the stimuli to nerve impulses ✓
- The nerve impulses are transported along the auditory nerve ✓
- to the cerebellum ✓ to be interpreted
- Impulses sent to muscles ✓ to restore balance

(Any 5) (5)

3.4.4 - The mucus will block the opening of the Eustachian tube ✓
- Air cannot enter or leave ✓/the middle ear
- to equalise pressure ✓/causing imbalance in pressure

OR

- Mucus may move through the Eustachian tube ✓
- causing pressure in the middle ear ✓
- pushing on the tympanic membrane ✓/part E

(3)

3.4.5 - The ossicles/structures at A will not be able to vibrate ✓
- and hence no vibrations will be passed to the inner ear ✓/cochlea will not be stimulated/no amplification

(2) (13) [40]

TOTAL SECTION B: 80
SECTION C

QUESTION 4

Spermatogenesis✓ (S)
- Takes place under the influence of testosterone✓
- in the seminiferous tubules✓/testis
- Diploid cells✓/germinal epithelium
- undergo meiosis✓
- to form haploid sperm cells✓

(Any 4) (4)

Formation and transport of semen (T)
- Sperm mature✓/are temporarily stored
- in the epididymis✓
- During ejaculation✓
- sperm move into the vas deferens✓
- As it passes the seminal vesicles✓,
- prostate gland✓ and
- Cowper's glands✓
- fluids are added that provide nutrition✓,
- promote the movement✓ of the sperm
- and neutralise the acids✓ produced in the vagina
- The semen passes through the urethra✓
- of the penis✓
- into the vagina✓
- during copulation✓
- and swims up the Fallopian tube✓ where it meets the ovum

(Any 7) (7)

Structural suitability of the sperm cell for fertilisation (A)
- The acrosome✓
- contains enzymes to dissolve a path into the ovum✓
- Nucleus of the sperm✓
- carries genetic material of the male✓/haploid number of chromosomes
- Many mitochondria✓ in the middle piece
- release energy✓ so that sperms could swim
- The presence of a tail✓
- enables sperm cells to swim✓ towards the ovum
- The contents of the sperm cell such as the cytoplasm is reduced✓/condensed
- making the sperm light for efficient movement✓
- Sperm is streamlined✓
- to allow for easier movement✓

(MARK FIRST THREE ONLY)

(Any 3 x 2) (6)

Content (17)
Synthesis (3)

(20)
ASSESSING THE PRESENTATION OF THE ESSAY

<table>
<thead>
<tr>
<th>Relevance (R)</th>
<th>Logical sequence (L)</th>
<th>Comprehensive (C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All information provided is relevant to the question</td>
<td>Ideas arranged in a logical/cause-effect sequence</td>
<td>Answered all aspects required by the essay in sufficient detail</td>
</tr>
<tr>
<td><strong>All information relevant to</strong>&lt;br&gt;- Spermatogenesis&lt;br&gt;- Formation and transport of semen&lt;br&gt;- Structural suitability of sperm.</td>
<td><strong>The information on</strong>&lt;br&gt;- Spermatogenesis&lt;br&gt;- Formation and transport of semen and&lt;br&gt;- Structural suitability of sperm is in a logical sequence</td>
<td><strong>The following must be included:</strong>&lt;br&gt;- Spermatogenesis (2/4)&lt;br&gt;- Formation and transport semen (5/7)&lt;br&gt;- Structural suitability of sperm (4/6)</td>
</tr>
<tr>
<td>There is no irrelevant information</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| 1 mark | 1 mark | 1 mark |

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

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