SENIOR CERTIFICATE EXAMINATIONS

LIFE SCIENCES P1

2017

MARKING GUIDELINES

MARKS: 150

These marking guidelines consist of 10 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

<table>
<thead>
<tr>
<th>Section</th>
<th>Subsection</th>
<th>Correct Answer(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>1.1</td>
<td>C✓✓</td>
</tr>
<tr>
<td></td>
<td>1.1.1</td>
<td>D✓✓</td>
</tr>
<tr>
<td></td>
<td>1.1.2</td>
<td>B✓✓</td>
</tr>
<tr>
<td></td>
<td>1.1.3</td>
<td>D✓✓</td>
</tr>
<tr>
<td></td>
<td>1.1.4</td>
<td>C✓✓</td>
</tr>
<tr>
<td></td>
<td>1.1.5</td>
<td>B✓✓</td>
</tr>
<tr>
<td></td>
<td>1.1.6</td>
<td>A✓✓</td>
</tr>
<tr>
<td></td>
<td>1.1.7</td>
<td>B✓✓</td>
</tr>
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<td></td>
<td>1.1.8</td>
<td>B✓✓</td>
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<tr>
<td></td>
<td>1.1.9</td>
<td>B✓✓</td>
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<td></td>
<td>1.1.10</td>
<td>D✓✓</td>
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(10 x 2) = 20

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<th>Subsection</th>
<th>Correct Answer(s)</th>
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<tbody>
<tr>
<td>1.2</td>
<td>1.2.1</td>
<td>Biodiversity✓</td>
</tr>
<tr>
<td></td>
<td>1.2.2</td>
<td>Carbon footprint✓</td>
</tr>
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<td></td>
<td>1.2.3</td>
<td>Thermal pollution✓</td>
</tr>
<tr>
<td></td>
<td>1.2.4</td>
<td>Eutrophication✓</td>
</tr>
<tr>
<td></td>
<td>1.2.5</td>
<td>Testosterone✓</td>
</tr>
<tr>
<td></td>
<td>1.2.6</td>
<td>Vas deferens✓/sperm duct</td>
</tr>
<tr>
<td></td>
<td>1.2.7</td>
<td>Aldosterone✓</td>
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<tr>
<td></td>
<td>1.2.8</td>
<td>Prolactin✓</td>
</tr>
<tr>
<td></td>
<td>1.2.9</td>
<td>Cytokinesis✓</td>
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(9 x 1) = 9

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<th>Correct Answer(s)</th>
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<td>1.3</td>
<td>1.3.1</td>
<td>A only✓✓</td>
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<td></td>
<td>1.3.2</td>
<td>B only✓✓</td>
</tr>
<tr>
<td></td>
<td>1.3.3</td>
<td>Both A and B✓✓</td>
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(3 x 2) = 6

<table>
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<th>Section</th>
<th>Subsection</th>
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<tbody>
<tr>
<td>1.4</td>
<td>1.4.1</td>
<td>(a) D✓ Synapse✓</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(b) C✓ Interneuron✓/Connector neuron</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(c) A✓ Dendrite✓</td>
</tr>
<tr>
<td></td>
<td>1.4.2</td>
<td>(a) E✓</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(b) F✓</td>
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</table>

(2) + (2) + (2) = 6

<table>
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<th>Section</th>
<th>Subsection</th>
<th>Correct Answer(s)</th>
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<tr>
<td>1.5</td>
<td>1.5.1</td>
<td>(a) Zygote✓</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(b) Morula✓</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(c) Placenta✓</td>
</tr>
<tr>
<td></td>
<td>1.5.2</td>
<td>(a) Fertilisation✓</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(b) Implantation✓</td>
</tr>
<tr>
<td></td>
<td>1.5.3</td>
<td>(a) 46✓/23 pairs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(b) 23✓</td>
</tr>
</tbody>
</table>

(1) + (1) + (1) + (1) = 4

**TOTAL SECTION A:** 50
SECTION B

QUESTION 2

2.1  2.1.1 - The hatchling’s eyes are closed ✓
- The hatchling can’t move ✓
- The hatchling can’t feed on its own ✓
- The hatchling has no feathers ✓/wings are not developed

(MARK FIRST TWO ONLY) (Any 2) (2)

2.1.2 - Foetus develops inside the uterus ✓ for greater protection ✓
- Food is supplied by the mother ✓ and is therefore supplied for a longer period ✓

(MARK FIRST ONE ONLY) (Any 1 x 2) (2)

2.1.3 - More yolk allows for greater development ✓ of the chick
- so that it can be more independent ✓ after hatching (2) (6)

2.2  2.2.1 Macular degeneration ✓/Retina cells die (1)

2.2.2 14.1/142 ✓ x 100 ✓ = 9.93 ✓
(Accept 9.9 and 10%) (3)

2.2.3

The number of people suffering from cataracts, short-sightedness and long sightedness ✓

<table>
<thead>
<tr>
<th>Number of people (millions)</th>
<th>Cataract</th>
<th>Short-sightedness</th>
<th>Long-sightedness</th>
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</thead>
<tbody>
<tr>
<td>24.4</td>
<td></td>
<td>34.1</td>
<td>14.1</td>
</tr>
</tbody>
</table>

Eye disorder/disease
Mark allocation of the graph

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Mark allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bar graph drawn for 3 relevant diseases (T)</td>
<td>1</td>
</tr>
<tr>
<td>Title of graph</td>
<td>1</td>
</tr>
<tr>
<td>Correct scale for X-axis (equal width and spacing of the bars) and Y-axis (S)</td>
<td>1</td>
</tr>
<tr>
<td>Correct label and unit for X-axis and Y-axis (L)</td>
<td>1</td>
</tr>
<tr>
<td>Plotting of the bars (P)</td>
<td>0: No bars plotted correctly</td>
</tr>
<tr>
<td></td>
<td>1: 1 to 2 bars plotted correctly</td>
</tr>
<tr>
<td></td>
<td>2: All 3 bars plotted correctly</td>
</tr>
</tbody>
</table>

NOTE:
If a line graph is drawn – marks will be lost for the ‘type and scale’
If a histogram is drawn – marks will be lost for the ‘type of graph and correct scale’

2.2.4  (a) Cataract✓

(b) Short-sightedness✓

2.3  2.3.1 (a) Crop yields are dropping✓

(b) Water supplies are decreasing✓

2.3.2 395✓ parts per million✓/ppm (Accept 394 – 396 ppm) (2)

2.3.3 - Decreased photosynthesis✓
- Less CO₂✓ used from the atmosphere
- therefore more carbon dioxide accumulates in the atmosphere✓
- This leads to the enhanced greenhouse effect✓ causing more global warming (Any 3)

OR

- Burning of forests✓
- releasing CO₂✓
- leading to the enhanced greenhouse effect✓
- causing more global warming (3)

2.4  - An excessive growth of water hyacinths on the surface of the water will block out the light✓/deprive submerged plants of sunlight
- this limits photosynthesis✓/disrupts food chains/food webs
- Alien plants outcompete the indigenous species✓/Alien plants have no natural enemies
- this may lead to some of the indigenous species becoming eliminated✓/disruption of the food chain/web
- The great demand of alien plants on natural resources✓
- results in less resources being available for the indigenous species✓

(MARK FIRST THREE ONLY)
2.5 2.5.1 Centriole✓

2.5.2 Metaphase II✓

2.5.3 - Single chromosomes✓
    - arranged at the equator✓ of the cell

2.5.4 - There is a random arrangement of chromosomes at the equator✓/the chromosomes flip over
    - Causing the chromosomes in the gametes to be different✓/Chromatids move in different combinations into each gamete

2.5.5 (a) 6✓
    (b) 3✓

2.5.6 Crossing over✓
**QUESTION 3**

3.1 3.1.1 Does drinking coffee containing caffeine increase stamina? ✓ ✓ (2)

3.1.2 (a) Amount of caffeine ✓/Presence or absence of caffeine (1)

(b) - Stamina ✓
  - By measuring the average duration of cycling ✓ (2)

3.1.3 The average cycling time of the cyclists/stamina increased with the use of caffeine ✓ ✓ (2)

3.1.4 - Decaffeinated coffee serves as a control ✓
  - to eliminate any other factor ✓ that may cause an increase in stamina/to confirm that caffeine causes the change (2)

3.1.5 - Knowing ✓ whether caffeine is taken or not
  - may subconsciously influence the performance ✓ of the participants.

  OR

  - The participants may think they have more stamina ✓ if they know that they are taking caffeine and
  - this may influence their performance ✓ (2)

3.1.6 - If too little time passes between the exercise tests, the participants may be tired ✓
  - which will influence their stamina for the second cycle test and therefore the validity ✓ of the investigation

  OR

  - The participants must be equally rested ✓ for both tests
  - to ensure the validity ✓ of the investigation

  OR

  - The cyclist may perform better in the second test because they are better warmed up ✓ if the time between the tests is too short.
  - This may influence the validity of the investigation ✓ (Any 1 x 2) (13)

3.2 3.2.1 (a) Oestrogen ✓ (1)

(b) Progesterone ✓ (1)

3.2.2 - It increases ✓
  - the thickness ✓ of the endometrium/the blood vessels in the endometrium/the amount of glandular tissue in the endometrium (2)

3.2.3 (a) Release of an ovum ✓ from the ovary ✓/Graafian follicle (2)

(b) Day 14 ✓ (1)

(c) LH ✓/Luteinizing hormone (1)
3.2.4  - High levels of hormone B/progesterone will inhibit
- the secretion of FSH
  OR
- No new ova/mature follicles
- are required during pregnancy

3.2.5  - The progesterone
- levels decreased
- because the corpus luteum degenerated

3.3 3.3.1 Geotropism/gravitropism

3.3.2  - Auxins
- accumulate at the lower part of the stem
- because of gravity
- The higher concentration of auxins at the lower part of the stem
  stimulates cell elongation/growth on the lower side of the stem
- The lower concentration of auxins at the upper part of the stem
  inhibits cell elongation/growth on the upper side of the stem
  (Any 4)

3.3.3  - The leaves and stem will be carried in such a way that they
  receive maximum sunlight
- for photosynthesis
  OR
- Exposes the flowers more favourably
- for pollination/seed dispersal

3.3.4  The roots will grow downwards/towards gravity

3.4 3.4.1 Hypothalamus

3.4.2  - As the level of ADH in the blood increases
  the tubular reabsorption of water increases
  OR
- As the level of ADH in the blood decreases
  the tubular reabsorption of water decreases

3.4.3  - On a cold day the body loses less water through sweating
  the blood has more water than normal
- The hypothalamus sends impulses to the
- pituitary gland
- to secrete less ADH
  (Any 3)

TOTAL SECTION B: 80
SECTION C

QUESTION 4

Thermoregulation
- Receptors in the skin detect the stimulus
- Send the impulses to the hypothalamus of the brain
- The hypothalamus sends impulses to the blood vessels of the skin
- Blood vessels constrict (become narrow)/vasoconstriction occurs
- Less blood flows to the skin
- Less heat is lost from the skin
- Less blood is sent to the sweat glands
- Sweat glands become less active/Less sweat is released
- There is less evaporation of sweat
- and less cooling of the skin

Hearing
- The pinna traps the sound waves
- and directs them into the auditory canal/meatus
- This causes the tympanic membrane to vibrate
- The vibration is transmitted to the auditory ossicles/(malleus, incus, stapes)
- The ossicles amplify the vibration
- and transmit it to the oval window
- The oval window vibrates
- creating pressure waves
- in the endolymph
- which stimulates the Organ of Corti
- The stimulus is converted to an impulse
- The impulse is transmitted via the auditory nerve
- to the cerebrum
- where sound is interpreted

ASSESSING THE PRESENTATION OF THE ESSAY

<table>
<thead>
<tr>
<th>Relevance</th>
<th>Logical sequence</th>
<th>Comprehensive</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>Only information regarding:</td>
<td>The sequence of events in thermoregulation and hearing is in the correct order.</td>
<td>At least the following points should be included:</td>
</tr>
<tr>
<td>- Thermoregulation in cold conditions and</td>
<td></td>
<td>- Thermoregulation in cold conditions (5/8)</td>
</tr>
<tr>
<td>- Hearing is described No irrelevant information.</td>
<td></td>
<td>- Hearing (6/9)</td>
</tr>
</tbody>
</table>

1 mark 1 mark 1 mark

TOTAL SECTION C: 20
GRAND TOTAL: 150