LIFE SCIENCES P1

FEBRUARY/MARCH 2016

MEMORANDUM

MARKS: 150

This memorandum consists 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

1.1  
1.1.1 C✓✓  
1.1.2 D✓✓  
1.1.3 C✓✓  
1.1.4 B✓✓  
1.1.5 B✓✓  
1.1.6 C✓✓  
1.1.7 A✓✓  
1.1.8 D✓✓  
1.1.9 B✓✓  
1.1.10 A✓✓  

(10 x 2)  **(20)**

1.2  
1.2.1 Vivipary✓/Viviparous  
1.2.2 Centrioles✓/Centrosome  
1.2.3 Geotropism✓/Gravitropism  
1.2.4 Carbon footprint✓  
1.2.5 Puberty✓  
1.2.6 Stimulus✓  
1.2.7 Grommets✓  
1.2.8 Pinna✓  

(8 x 1)  **(8)**

1.3  
1.3.1 B only✓✓  
1.3.2 Both A and B✓✓  
1.3.3 B only✓✓  
1.3.4 None✓✓  

(4 x 2)  **(8)**

1.4  
1.4.1 (a) A✓ - penis✓  
(b) E✓ - testes✓  

(2)  

1.4.2 (a) D✓ and E✓  
***(Mark first TWO only)***

(b) B✓ and C✓  
***(Mark first TWO only)***  

(2)  

(8)

1.5  
1.5.1 (a) E✓  
(b) A✓  
(c) C✓  

(1)  

(1)  

(1)

1.5.2 F✓ - motor neuron✓  
1.5.3 D to E✓  

(2)  

(1)  

(6)

**TOTAL SECTION A: 50**
SECTION B

QUESTION 2

2.1 2.1.1 (a) Round window ✓

(b) Cochlea ✓

2.1.2 Cristae ✓

2.1.3 (a) - Impulses from the cochlea cannot be transmitted to the brain ✓
- and therefore hearing will not occur ✓

(b) - Part A will not be able to vibrate ✓
- The round window will not absorb the sound waves ✓ from the cochlea
- and hearing will be affected ✓

(Any 2)

(2)

(7)

2.2 - Mucus in the middle ear ✓
- will lead to the blockage of the Eustachian tube ✓
- which will not be able to equalise the pressure ✓ in the middle ear
- resulting in pressure on the tympanic membrane ✓
- that may cause the tympanic membrane to burst ✓
- leading to hearing loss ✓

(Any 4)

(4)
2.3.1

Graph to show the relationship between ages of women and the percentage of pregnancies per month

<table>
<thead>
<tr>
<th>Mark allocation of the graph</th>
<th>Criteria</th>
<th>Mark Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Correct type of graph drawn for the pregnancies per month only</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Title of graph including the two variables (Age of women and pregnancies per month)</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Correct label and unit for X-axis and Y-axis</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Correct scale for X-axis and Y-axis</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Drawing of the graph</td>
<td>0: No points plotted correctly</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1: 1 to 4 points plotted correctly</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2: All 5 points plotted correctly</td>
</tr>
</tbody>
</table>

**NOTE:**
If axes are transposed: marks will be lost only for labelling of X-axis and Y-axis

2.3.2 The older the women, the higher the chances of having miscarriages ✓ ✓

OR

The younger the women, the lower the chances of having miscarriages ✓ ✓

2.3.3 $50\% \times 12$ ✓ $= 6$

OR

$\frac{50}{100} \times 12$ ✓ $= 6$

(10)
2.4.1  As a result of the blocked Fallopian tube
- the sperm cannot reach the ovum
- therefore fertilisation cannot take place

(Any 2)  (2)

2.4.2  (a) FSH/follicle stimulating hormone
(Mark first ONE only)

(b) Oestrogen
(Mark first ONE only)

2.4.3  - A zygote is formed
- which divides by mitosis
- forming a ball of cells
- called the morula
- which further divides to form a hollow ball of cells

(Any 4)  (4)

2.4.4  - Progesterone levels would fall
- The endometrium would no longer be maintained
- A miscarriage would occur

(3)  (11)

2.5  2.5.1  Metaphase I

(1)

2.5.2  - Crossing over has taken place
- and genetic material was exchanged

(2)

2.5.3  Anaphase II

(1)

2.5.4  - The spindle fibres contract
- The centromeres split
- and pull the daughter chromosomes/chromatids
- to the opposite poles of the cells
- Cytokinesis begins

(Any 3)  (3)

2.5.5  Testes/seminiferous tubules
(Mark first ONE only)

(1)  (8)  [40]
QUESTION 3

3.1 3.1.1 (a) ADH\(/\)antidiuretic hormone (1)
(b) Hypothalamus\(/\)Pituitary gland (1)
(c) Kidneys\(\checkmark\) (1)

3.1.2 - An increase in ADH causes the walls of the kidney tubules\(\checkmark\)
- to become more permeable\(\checkmark\) to water
- More water is reabsorbed\(\checkmark\)
- and the blood volume increases\(\checkmark\)
- Less urine is produced\(\checkmark\)
- and the urine is more concentrated\(\checkmark\) (Any 4) (7)

3.2 3.2.1 Pancreas\(\checkmark\) (1)

3.2.2

<table>
<thead>
<tr>
<th>Insulin A</th>
<th>Insulin B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glucose uptake peaks at a</td>
<td>Glucose uptake peaks at</td>
</tr>
<tr>
<td>higher level(\checkmark)/around</td>
<td>lower level(\checkmark)/around</td>
</tr>
<tr>
<td>7 mg/kg/min</td>
<td>1 mg/kg/min</td>
</tr>
<tr>
<td>All glucose uptake occurs in a</td>
<td>Glucose uptake is gradual(\checkmark)/</td>
</tr>
<tr>
<td>short period of time(\checkmark)/the first</td>
<td>sustained over a period of</td>
</tr>
<tr>
<td>5 hours</td>
<td>24 hours</td>
</tr>
<tr>
<td>The initial uptake of glucose</td>
<td>The initial uptake of glucose</td>
</tr>
<tr>
<td>rises rapidly to a maximum</td>
<td>rises slowly to the maximum</td>
</tr>
<tr>
<td>within the first few hours(\checkmark)</td>
<td>over 5 hours(\checkmark)</td>
</tr>
</tbody>
</table>

TABULATION IS NOT REQUIRED (Any 2 x 2) (4) 
(Mark first TWO only) (5)

3.3 3.3.1 (a) Amount of thyroxin\(\checkmark\) (1)
(b) Body weight\(\checkmark\) (1)

3.3.2 - Same number of rats in each group\(\checkmark\)
- All rats were of the same species\(\checkmark\)
- All groups were investigated for the same period of time\(\checkmark\)
- All rats were the same gender\(\checkmark\)
- All groups were weighed after the same interval\(\checkmark\) (Any 3) (3)
(Mark first THREE only)

3.3.3 Group A\(\checkmark\) (1)

3.3.4 - Low thyroxin levels\(\checkmark\)
- will lead to low metabolic rate\(\checkmark\)
- Therefore the energy from the diet is used very slowly\(\checkmark\)
- and more organic compounds are stored\(\checkmark\) (Any 3) (3)

3.3.5 Group B\(\checkmark\) (1)

3.3.6 - These rats have high levels of thyroxin in their blood\(\checkmark\)
- therefore pituitary gland will not be stimulated\(\checkmark\) to secrete TSH (2) (12)
3.4  3.4.1
- Poor infrastructure✓
- Climate change✓
- Wastage✓
- Pollution of water sources✓
(Any 2) (2)
(Mark first TWO only)

3.4.2
- The need of water for irrigation will be reduced✓ (1)

3.4.3
- Decreased production✓
- will lead to loss of profit✓ (2)

3.4.4
- More revenue for fixing poor infrastructure✓/building dams
- Less water wastage✓by individuals and companies (2)
(Mark first TWO only) (7)

3.5  3.5.1
(a)
- Invasive alien plants reduce food security✓
- since they grow rapidly and invade land✓
- that could be used to grow crops✓ (3)

(b)
- Invasive alien plants reduce water availability✓
- since they use more water✓ (2)

3.5.2
(a)
- The new organism may become a pest itself✓/it may feed on
indigenous plants instead of the targeted alien plant
- since no natural enemy for it was brought into the area✓ (2)

(b)
- Some parts that are left behind✓
- can regrow✓/will cost more money to remove them again (2)
[9] [40]

TOTAL SECTION B: 80
SECTION C

QUESTION 4

Plant stems response to unilateral light
- Plant stems response to light is positively phototropic✓
- Auxins✓
- produced in the tip of the stem✓
- move away from unilateral light✓
- so that there is a high concentration of auxins on the darker side✓
- which stimulates growth✓/cell division/cell elongation
- The low concentration of auxins on the side exposed to light✓
- inhibits growth✓
- This uneven growth✓
- causes the stem to bend towards the light✓ Max 7

How humans receive and interpret light stimuli
- Light enters the eye ✓
- through the cornea✓
- which refracts the light✓
- It then passes through the aqueous humour✓
- and the pupil✓
- The size of the pupil is adjusted by the iris✓
- to regulate the amount of light that enters the eye✓
- The light then passes through the lens✓
- which also refracts the light✓
- It then passes through the vitreous humour✓
- and reaches the retina✓
- which has the photoreceptors✓/rods and cones which convert the light stimulus into a nerve impulse Max 10

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>All the information provided is relevant to plant stems' response to unilateral light and how humans receive and interpret light stimuli.</td>
<td>All the information regarding how plant stems respond to unilateral light and how humans receive and interpret light stimuli are arranged in a logical manner.</td>
<td>At least the following points should be included:</td>
</tr>
<tr>
<td>No irrelevant information.</td>
<td></td>
<td>- Plant response to unilateral light (4/7)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- How humans receive and interpret light stimuli (7/10)</td>
</tr>
</tbody>
</table>

| | 1 mark | 1 mark | 1 mark |

TOTAL SECTION C: 20
GRAND TOTAL: 150