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✓ (2)
     (b) E✓ - testes✓ (2)

     1.4.2 (a) D✓ and E✓ (Mark first TWO only) (2)
     (b) B✓ and C✓ (Mark first TWO only) (8)

1.5  1.5.1 (a) E✓ (1)
     (b) A✓ (1)
     (c) C✓ (1)

1.5.2 F✓ - motor neuron✓ (2)
1.5.3 D to E✓ (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 2.3.1

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

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

$\frac{50}{100} \times 12 = 6✓$

50%
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) (1)
(b) Oestrogen ✓  (Mark first ONE only) (1)

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\(\checkmark\)/antidiuretic hormone (1)
(b) Hypothalamus\(\checkmark\)/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) (4)

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 rises</td>
<td>The initial uptake of glucose</td>
</tr>
<tr>
<td>rapidly to a maximum within the</td>
<td>rises slowly to the maximum over</td>
</tr>
<tr>
<td>first few hours(\checkmark)</td>
<td>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 ✓

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 ✓

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>

| | Max 7 | Max 10 | (10) |
| Content: | (17) |
| Synthesis: | (3) |

TOTAL SECTION C: 20
GRAND TOTAL: 150