This memorandum consists of 12 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 the 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 A✓✓
     1.1.2 C✓✓
     1.1.3 C✓✓
     1.1.4 A✓✓
     1.1.5 C✓✓
     1.1.6 C✓✓
     1.1.7 C✓✓
     1.1.8 D✓✓
     1.1.9 B✓✓
     1.1.10 C✓✓ (10 x 2) (20)

1.2  1.2.1 Medulla oblongata✓
     1.2.2 Homeostasis✓
     1.2.3 Abscisic acid✓/ABA
     1.2.4 Meninges✓
     1.2.5 Aldosterone✓
     1.2.6 Ozone✓/O₃
     1.2.7 Testosterone✓/FSH/LH (7)

1.3  1.3.1 Both A and B✓✓
     1.3.2 B only✓✓
     1.3.3 A only✓✓
     1.3.4 B only✓✓
     1.3.5 Both A and B✓✓ (5 x 2) (10)

1.4  1.4.1 (a) A✓ - ciliary muscle✓ (2)
     (b) C✓ - iris✓ (2)
     (c) D✓ - cornea✓ (2)
     1.4.2 Accommodation✓ (1)
     1.4.3 Diagram 2✓ (1) (8)

1.5  1.5.1 Phototropism✓ (1)
     1.5.2 Light✓/Sunlight/Radiant energy (1)
     1.5.3 Auxins✓/IAA/Indole acetic acid (1)
     1.5.4 Inhibit ✓ (1)
     1.5.5 Apical dominance✓ (1) (5)

TOTAL SECTION A: 50
SECTION B

QUESTION 2

2.1 2.1.1 (a) Eustachian tube ✓ (1)
        (b) Round window ✓ (1)
        (c) Cochlea ✓ (1)

2.1.2 - Air will not be taken in ✓/released ✓
       - to equalise pressure ✓
       - on both sides of the tympanic membrane ✓
       - Tympanic membrane/ossicles may not vibrate freely ✓
       - This may lead to the tympanic membrane bursting ✓ and
       - therefore could lead to hearing loss ✓/deafness/ pain (Any 4) (4)

2.1.3 Changes in the direction and speed of movement:
       - Causes the endolymph to move ✓ in part D/semi-circular canals
       - The cristae ✓
       - found in the ampulla ✓ are stimulated
       - and converts the stimulus into an impulse ✓
       - which is transmitted via the auditory nerve ✓/vestibular nerve
       - to the cerebellum ✓
       - from which impulses are transmitted via motor neurons ✓
       - to the skeletal muscles ✓/effector to restore balance of the body
         (Any 5) (12)

2.2 2.2.1 (a) Chromosome ✓ (1)
         (b) Spindle fibre ✓ (1)
         (c) Centromere ✓ (1)

2.2.2 Metaphase II ✓ (1)

2.2.3 - Chromosomes lying independently ✓/singly
         - at the equator ✓ (2)
2.2.4

Mark allocation:

C - Shows 4 chromosomes✓✓ (not chromatids)
S - Shows separation✓ of genetic material
D - Correct variation shown in the chromosomes✓ (shading on the chromosomes must be complementary)
(Use the letters for marking process)

(4) (10)
2.3 2.3.1
- Seek permission/ethical clearance
- Deciding on the sample size
- Deciding on the equipment for measuring
- Deciding on the age-group of the participants
- Deciding on using women with regular menstrual cycles
- Deciding on how to record the results
- Decide on the duration
- Learning how to use the equipment

(Any 2) (2)

(MARK FIRST TWO ONLY)

2.3.2
(a)
- The follicles decreased in size
- as ovulation had taken place
- The resulting corpus luteum became smaller
- because fertilisation did not take place

(Any 3) (3)

(b)
- The production of FSH
- will be inhibited
- which will stop/inhibit the development/growth of a follicle
- therefore the follicle size will remain the same

(Any 3) (8)

2.4 2.4.1
(a) Medulla oblongata

(1)

(b) Corpus callosum

(1)

(c) Cerebellum

(1)

2.4.2
- Controls all voluntary activities
- It contains centres that receives and interprets all the sensations
- It is the seat of higher mental functions
- Influences emotional behaviour

(Any 3) (6)

(MARK FIRST THREE ONLY)

2.5
- Every organ and gland is controlled by two sets of nerves
- that act antagonistically
- to control involuntary events/brings about homeostasis
- Sympathetic nerves
- generally stimulates a response
- Parasympathetic nerves
- generally inhibits a response

(Any 4) (4)

[40]
QUESTION 3

3.1 - Receptor cells in the carotid artery/aorta are stimulated to send impulses to the medulla oblongata in the brain which then stimulates the heart to beat faster and the breathing muscles/example to contract more actively. This increases the rate/depth of breathing. More CO₂ is taken to and exhaled from the lungs/returning the CO₂ level in the blood to normal. (Any 6) (6)

3.2 3.2.1 Comparison of the blood glucose level of two people over 5 hours/before and after ingesting glucose (2)

3.2.2 (145 – 125)/Accept numbers in range 144 -146 for the first value and 124 -126 for the second value) = 20⁰ mg/100 cm³ (Accept answer according to the values given by learner) (2)

3.2.3 Accept any answer from 1,7 to 1,9 hours /102 – 114 minutes/ 1h42min – 1h54min (1)

3.2.4 (a) Thabiso (1)

(b) - His glucose level is higher than the normal range - It takes longer for his glucose level to come down to its original level (Any 1) (1) (MARK FIRST ONE ONLY)

3.2.5 - When his glucose level is high/ 99/98 mg/100cm³ - insulin is secreted into the blood - to convert excess glucose into glycogen in the liver - and to stimulate the cells to absorb more glucose - thus decreasing the blood glucose level (Any 4) (4) (11)

3.3 3.3.1 Poaching (1)

3.3.2 - Deforestation - Urbanisation - Mining - Agriculture - Veld fires - Building - Pollution - Introduction of alien species/ (Any 1) (1) (MARK FIRST ONE ONLY)
3.3.3 - Increasing human population✓
- Increasing unemployment✓/poverty
- Increased prices of bush-meat✓/greed
- Increased demand✓
- Poor protection of wildlife✓

(Any 2) (2)

(MARK FIRST TWO ONLY)

3.3.4 - Disturbs the ecosystem✓
- because food chains are affected✓
- leading to the extinction of some species✓ in the ecosystem
- and will eventually lead to loss of biodiversity✓

(Any 3) (3)

3.3.5 - Very old animals have passed the reproductive stage in their lives✓/old animals are at the end of lifespan
- therefore may not significantly influence the size of the population✓
- Weak animals have a short lifespan✓
- and will not contribute to the survival of the population✓
- Killing old and weak animals may prevent a population from exceeding carrying capacity✓
- Genes causing weakness will be removed from the gene pool✓

(Any 3) (3) (10)

3.4 3.4.1 - Food security refers to the access✓
- of adequate✓/safe/nutritious food
- to all people at all times✓

(Any 2) (2)

3.4.2 - Price is added to cover the cost of transportation✓ over long distances
- No competition✓ between dealers in rural areas
- Decrease demand✓ for goods in rural areas

(MARK FIRST ONE ONLY)

3.4.3 - Decreased need to buy food✓
- Selling of excess produce to earn some money✓

(MARK FIRST TWO ONLY)

3.4.4 - Making people aware of the benefits of farming✓
- Providing resources✓/example
- Developing skills for farming✓
- Providing incentives✓ to encourage farming

(Any 2) (2)

(MARK FIRST TWO ONLY)
Mark allocation of the graph

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Mark Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bar graph drawn (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>
</tbody>
</table>
| Plotting of the bars (P)                                                | 0: No bars plotted correctly  
1: 1 to 2 bars plotted correctly  
2: All 3 bars plotted correctly |

NOTE:
If a line graph is drawn – marks will be awarded for the ‘title and label for X and Y axes’ only
If a histogram is drawn – marks will be lost for the ‘type of graph and correct scale’ only

TOTAL SECTION B: 80
SECTION C

QUESTION 4

Structural suitability of the sperm cell for internal fertilisation

- The front of the head of the sperm cell contains an acrosome/vesicle which carries enzymes to dissolve a path into the ovum

- Nucleus of the sperm carries genetic material of the male/ haploid number of chromosomes

- The middle piece contains mitochondria which release energy so that sperms could swim

- The presence of a long 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

(Fertilisation)

- In the Fallopian tubes
- one sperm cell makes contact with the ovum’s membrane
- The nucleus of the sperm enters the ovum
- Then the ovum membrane becomes impenetrable to other sperms
- The nucleus of the sperm fuses with the nucleus of the ovum OR sperm fuses with an ovum
- to form a diploid zygote
- This is called fertilisation

(Events after fertilisation until implantation)

- The zygote divides by mitosis many times
- to form an embryo
- It first consists of a ball of cells which then develops into a hollow ball of cells called the morula
- called the blastula/blastocyst
- It embeds itself into the uterus lining/endometrium
- using chorionic villi
# 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: - The structural suitability of the sperm cell - Events during fertilisation - Events after fertilisation until implantation</td>
<td>All structures are related to the respective functions of the sperm cell. The sequence of events in fertilisation and post fertilisation until implantation is in the correct order.</td>
<td>At least the following points should be included: - The structural suitability of the sperm cell (4/6) - Events during fertilisation (3/5) - Events after fertilisation until implantation (4/6)</td>
</tr>
</tbody>
</table>

| 1 mark | 1 mark | 1 mark |

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