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 ✓ ✓
     1.3.2  B only ✓ ✓
     1.3.3  A only ✓ ✓

(3 x 2)  (6)

1.4  1.4.1  Motor ✓ neuron

(1)

     1.4.2  (a) Nucleus ✓ / nuclear membrane
              (b) Cytoplasm ✓
              (c) Dendrite ✓

(1)

     1.4.3  (a) C ✓ - Axon ✓
              (b) D ✓ - Myelin sheath ✓

(2)

     1.4.4  Multiple sclerosis ✓

(1)

(9)

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

(1)

(1)

(1)

(1)

(5)

TOTAL SECTION A:  50
SECTION B

QUESTION 2

2.1  2.1.1 Northern Cape✓

2.1.2 Eastern Cape✓

2.1.3 74,72 OR 74,7 OR 75✓✓✓%

OR (if candidate does not have above answer)

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

2.1.4 - Western Cape✓ and
  - Kwazulu-Natal✓

(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✓

(MARK FIRST TWO ONLY)

(Any 2 x 2)
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 ✓ (Any 2 x 2) (4)
(MARK FIRST TWO ONLY) (15)

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' ✓ (Any 1) (1)
(MARK FIRST ONE ONLY)

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 ✓ (Any 1 x 2) (2)
(MARK FIRST ONE ONLY) (8)
2.3 2.3.1 Telophase II ✓

2.3.2 - There are 4 cells ✓
- Each cell contains only a single set of un-replicated / single stranded chromosomes

(MARK FIRST TWO ONLY)

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

2.3.4 (a) - Crossing over ✓
- Random arrangement ✓ of chromosomes on the equator

(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 ✓

(b) Umbilical cord ✓

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)

(7)

[40]
QUESTION 3

3.1 3.1.1 - The growth of a plant✓/part of a plant
   - in response to a stimulus✓

3.1.2

Checklist for marking the diagram:

<table>
<thead>
<tr>
<th>Caption</th>
<th>(1)</th>
</tr>
</thead>
<tbody>
<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>Total</td>
<td>(4)</td>
</tr>
</tbody>
</table>

3.2 3.2.1 Tip of the stem✓/tip of root/apical meristem/terminal bud/apical bud

3.2.2 - The stem grows✓✓/bends
   - towards the light✓✓

3.3 3.3.1 - Group A✓
   - Group C✓

3.3.2 (a) Amount of Thyroxin✓
   (b) Metabolic rate✓
      By measuring the change in mass✓/consumption of oxygen

3.3.3 Z, X, Y ✓✓
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) (16)

3.4  3.4.1  (a) Auditory nerve ✓  (1)

(b) Round window ✓/Fenestra rotunda (1)

3.4.2  Cerebrum ✓  (1)

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✓

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

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)
**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>All information relevant to - Spermatogenesis - Formation and transport of semen - Structural suitability of sperm.</td>
<td>The information on - Spermatogenesis - Formation and transport of semen and - Structural suitability of sperm is in a logical sequence</td>
<td>The following must be included: - Spermatogenesis (2/4) - Formation and transport semen (5/7) - 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