basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 10

LIFE SCIENCES P1

EXEMPLAR 2012

MEMORANDUM

MARKS: 150

This memorandum consists of 8 pages.

PRINCIPLES RELATED TO MARKING LIFE SCIENCES 2012

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 part of it is required**
   Read all and credit relevant part.

4. **If comparisons are asked for and descriptions are given**
   Accept if 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 becomes 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 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 provided it does not mean something else in Life Sciences or if it is out of context**.**

13. **If common names given in terminology**
    Accept, provided it was accepted at the National memo discussion meeting.

14. **If only letter is asked for and only name is given (and vice versa)**
    No 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, et cetera) must have a caption.

SECTION A

QUESTION 1

1.1	1.1.1	A✓✓		
	1.1.2	A✓✓		
	1.1.3	B ✓✓		
	1.1.4	C✓✓		
	1.1.5	B✓✓		
	1.1.6	C✓✓		
	1.1.7	C✓✓		
	1.1.8	D✓✓		
	1.1.9	D✓✓	(9 x 2)	**(18)**
1.2	1.2.1	Chlorophyll✓		
	1.2.2	Diffusion✓		
	1.2.3	Cancer✓		
	1.2.4	Parenchyma✓		
	1.2.5	Substrate✓		
	1.2.6	12✓		
	1.2.7	Stomata✓		
	1.2.8	Neuron✓		**(8)**
1.3	1.3.1	A only✓✓/A		
	1.3.2	A only✓✓/A		
	1.3.3	B only✓✓/B		
	1.3.4	Both A and B✓✓/A and B/Both		
	1.3.5	A only✓✓		
	1.3.6	B only✓✓/B		
	1.3.7	B only✓✓/B		
	1.3.8	None✓✓		
	1.3.9	B only✓✓/B	(9 x 2)	**(18)**
1.4	1.4.1	Secretion✓		
	1.4.2	Animal✓		
	1.4.3	Mitochondrion✓		
	1.4.4	Both✓		
	1.4.5	Photosynthesis✓		
	1.4.6	Plant✓		**(6)**

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 2.1.1 Y✓ (1)

2.1.2 Large vacuole✓
Have chloroplasts✓
Presence of a cell wall✓
(Mark first TWO only) Any 2 (2)

2.1.3 A – mitochondrion
B – endoplasmic reticulum (2)

2.1.4 Stores water, organic and inorganic substances.✓
Ensure turgor pressure to support young plant cells.✓
The high concentration of solutes in the vacuole increases the uptake of water by osmosis.✓
(Mark first THREE only) (Any 3) (3)

2.1.5 Cellulose✓ (1)
(9)

2.2 2.2.1 A – Centromere✓
B – Chromatid✓
D – Nucleolus✓
E – Centriole✓ (4)

2.2.2 4✓→ 1✓→ 5✓→ 2✓→ 3✓ (5)

2.2.3 4✓ (1)

2.2.4 In animal cells the cytoplasmic membrane constricts/pinches off✓ in the middle
In plant cells new cytomembranes or cell plate and a cross-wall✓ are laid down (2)

2.2.5 Growth✓
Repair✓ of worn or damaged tissues
Reproduction✓
(Mark first TWO only) Any 2 (2)
(14)

2.3 2.3.1 A membrane allowing certain substances✓ to move through and not others. ✓ (2)

2.3.2 The cell shrinks✓
because of the water moving out✓/exosmosis
The water potential in the cell is higher✓ than the water potential outside✓ the cell. (4)

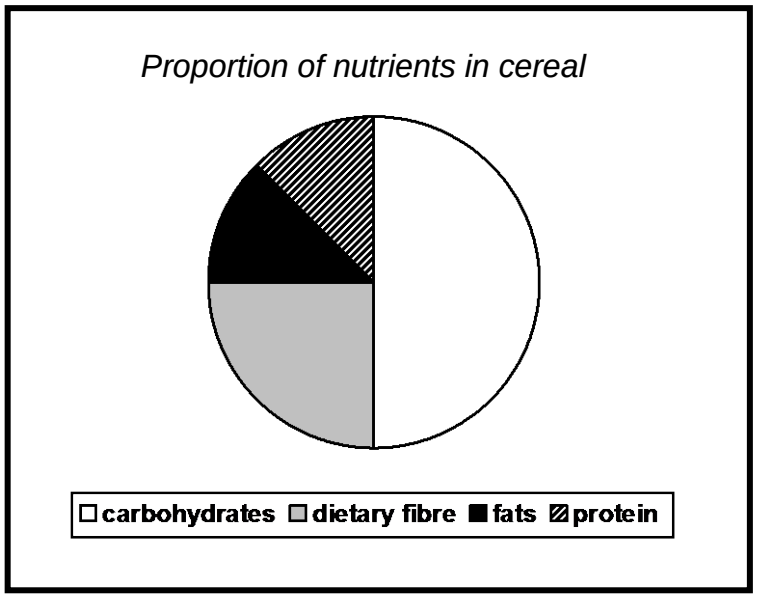
2.3.3 (Ex)osmosis/Plasmolysis✓ (1)
(7)

2.4 2.4.1 - an excess of cholesterol would accumulate in blood vessels✓
- thus clogging them✓/causing heart defects
(Mark first ONE only)

(2)

2.4.2 $\frac{100 \times 5\,500}{2\,000}$ ✓
= 275 ✓g/0,275 ✓kg ✓ (2)

2.4.3



Correct type of graph	1
Correct proportions for each labelled slice	4
Title	1

(6)
(10)
[40]

QUESTION 3

3.1 Together with muscles it plays an important role in locomotion✓/ movement.
It protects✓ the delicate or sensitive parts of the body.
Mineral salts are stored✓ in it.
It gives the body strength and shape/✓support.
Three smallest bones in the middle ear for hearing.✓
(Mark first FOUR only) Any 4 (4)

3.2 3.2.1 B – Ligament✓
C – Radius✓
D – Ulna✓ (3)

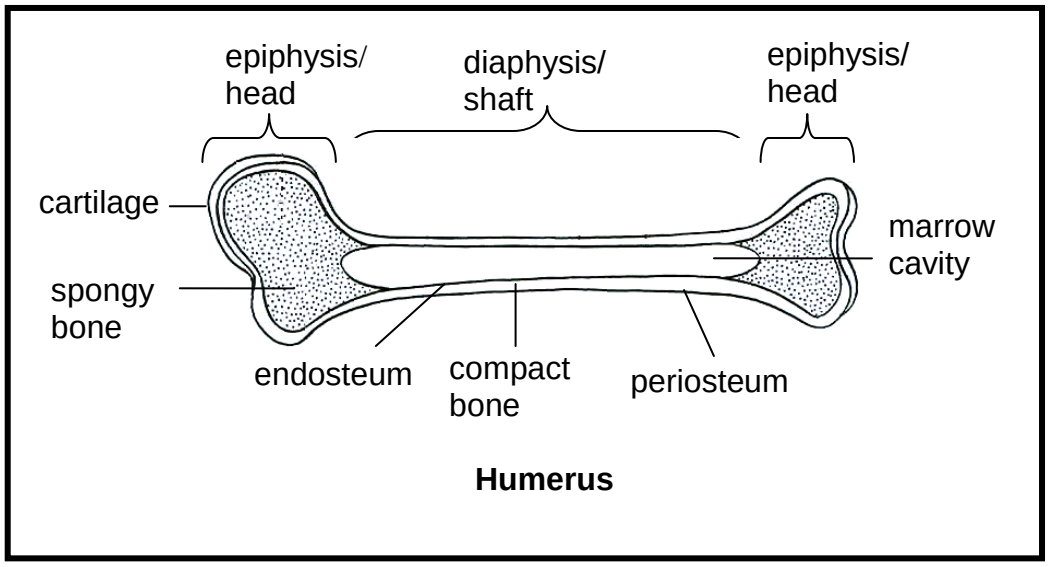
3.2.2 Hinge✓ joint (1)

3.2.3 (a) - Inner lining secretes synovial fluid✓
- Prevents synovial fluid from leaking out✓
- Prevents germs from entering✓
(Mark first TWO only) Any 2 (2)

(b) The ligament hold the two bones together✓
(Mark first ONE only) Any 1 (1)

3.2.4 Tendon✓ of biceps muscle (1)

3.2.5



Humerus

<u>Mark allocation</u>
Caption✓
Epiphysis and diaphysis shown and labelled✓
Proportions of epiphysis and diaphysis✓
Any THREE other labels✓✓ ✓ (6)
(14)

3.3 3.3.1 The higher/lower the light intensity✓ the higher/lower✓ the rate of water loss.✓

OR

No✓ relationship between the light intensity✓ and the rate of water loss.✓ (3)

3.3.2 Water loss✓ (1)

3.3.3 Beyond this value✓no further increase in water loss✓

OR

largest✓ water loss✓at this light intensity. (2)

3.3.4 Prevents water evaporation✓ from the surface. (1)

3.3.5 Allows sufficient time✓ for the plant to adjust✓ to new light intensities. (2)

3.3.6 Slower rate of water loss✓ (1)

3.3.7 Decrease✓ in evaporation rate✓ (2)

3.3.8 Repeat✓ the investigation several times at each light intensity use the average✓ (2)
(14)

3.4 3.4.1 W – Iodine solution✓ (1)
X – Fehling A & B✓/Benedict's solution (1)
Y – Millon's✓reagent (1)

3.4.2 1 – Starch✓ (1)
2 – Glucose✓ (1)
3 – Protein✓ (1)

3.4.3 (a) Brown✓colour (1)
(b) Blue✓ colour (1)
(8)
[40]

TOTAL SECTION B: 80

SECTION C

QUESTION 4

Absorption of water and lateral movement to the xylem

- Water potential✓ of the soil higher✓
- than that of the cell sap✓ of the root hair.
- Water moves from soil solution by process of osmosis✓
- through permeable cell wall,✓
- differentially cell membrane✓ and cytoplasm✓
- through the tonoplast into the vacuole✓ of root hair.
- Water potential of root hair increases✓ and is higher
- than that of the adjacent cortical cells.✓
- Water diffuses along water potential gradient✓
- via intercellular air spaces and cell walls or cell membranes✓ of the cortical cells
  or
- via plasmodesmata✓ through from cell to cell
- across the cortex✓
- through the Casparian bands✓ of the endodermis✓ into the xylem. Any 11 (11)

Structural suitability of xylem

Xylem vessels:

- Are elongated/end to end✓ to allow transport of water to great heights✓
- Are non-living✓ to facilitate rapid movement of water✓
- Have large lumens✓ to allow for unrestricted flow of water✓
- Cross walls absent✓/to allow easy passage of water✓
- The walls of the xylem elements are thickened✓/contain lignin
- to withstand tension of cohesion and adhesion✓/the strong forces that cause the water to rise/prevent collapsing Any 3 x 2 (6)

Content (17)

ASSESSING THE PRESENTATION OF THE ESSAY

Marks	Description
3	Well structured – demonstrates insight and understanding of question
2	Minor gaps or irrelevant information in the logic and flow of the answer
1	Significant gaps or irrelevant information in the logic and flow of the answer
0	Not attempted/nothing written other than the question number/no relevant information

Synthesis (3)

TOTAL SECTION C: 20
GRAND TOTAL: 150