



# education

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Department:  
Education  
**REPUBLIC OF SOUTH AFRICA**

**SENIOR CERTIFICATE EXAMINATION – 2008**

**BIOLOGY P2**

**HIGHER GRADE**

**MAY/JUNE 2008**

**MEMORANDUM**

**MARKS: 200**

**This memorandum consists of 15 pages.**

**PRINCIPLES RELATED TO MARKING HG & SG BIOLOGY 2008**

***This document should be attached to all memoranda at the end of 2008 and made available to ALL Life Sciences teachers.***

1. **If more information is given than marks allocated**  
Stop marking when maximum marks are 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 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 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 the word does not mean something else in Biology or if it is out of context.
13. **If common names given in terminology**  
Accept provided it is accepted at *this* memo discussion.

14. **If letter only is asked for and name only 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, etc.) must have a caption.
18. If you have doubts consult the other language memo. If you still have doubts ask the Provincial Internal Moderator to contact the National Internal Moderator or the External Moderators.
19. **Code-switching of official languages (terms and concepts)**  
A single word or two that appears 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.
20. No changes may be made to the marking memoranda without consulting the Provincial Internal Moderator who in turn will consult with the External Moderator/s.
21. Only memoranda bearing the signatures of the UMALUSI moderators and distributed by the National Department of Education via the Provinces may be used.

**SECTION A**

**QUESTION 1**

**1.1**

1.1.1 D ✓✓

1.1.2 C ✓✓

1.1.3 C ✓✓

1.1.4 B ✓✓

1.1.5 D ✓✓

1.1.6 C ✓✓

1.1.7 A ✓✓

1.1.8 A ✓✓

**(8 x 2) (16)**

**1.2**

1.2.1 Vitreous humour ✓

1.2.2 Blind spot ✓

1.2.3 Sclera ✓

1.2.4 Accommodation ✓

1.2.5 Diffusion ✓

1.2.6 Guard cells ✓

1.2.7 Wall pressure ✓

**(7)**

**1.3**

- 1.3.1 B only/B ✓✓
- 1.3.2 Both A and B / A and B / Both ✓✓
- 1.3.3 Both A and B / A and B / Both ✓✓
- 1.3.4 B only/B ✓✓
- 1.3.5 A only/A ✓✓
- 1.3.6 Both A and B / A and B / Both ✓✓
- 1.3.7 None ✓✓
- 1.3.8 None ✓✓

**(8 x 2) (16)****1.4**

- 1.4.1 To investigate the suction ✓ force of transpiration ✓  
**OR**  
Transpiration ✓ pull ✓ (2)
- 1.4.2 Xylem ✓ (1)
- 1.4.3 - Vessels and tracheids are elongated tubes / arranged end to end ✓  
to form a continuous tube ✓  
- Walls strengthened with lignin ✓  
to withstand pressure ✓  
- Xylem vessels and tracheids dead/ no cross walls / large lumen ✓  
for water to pass freely ✓  
- Perforated with pits ✓  
to allow passage of water horizontally in and out of the xylem ✓ Any 2 x 2 (4)  
**Mark first 2 answers only**
- 1.4.4 - Prevent any air bubbles from entering the apparatus ✓  
- Handle toxic mercury with care ✓  
- ensure cut end of twig is in water ✓ Any 2 (2)  
**Mark first 2 answers only**
- 1.4.5 - A leaf with a thick cuticle / hairs / leaves shading one another / very few  
stomata / fewer leaves / smaller leaves ✓  
- thus less water lost ✓  
- less movement of mercury ✓ (3)  
**Mark first answer only**

- 1.4.6 - Wind ✓  
- Temperature ✓  
- Light intensity ✓  
- Humidity ✓

Any 2 (2)  
**Mark first 2 answers only (14)**

**1.5**

- 1.5.1 Antibodies / bacteria / increased permeability of the glomeruli / passing of blood cells into urine ✓ (1)
- 1.5.2 Yes ✓ (1)
- 1.5.3 - Endothelial and basal membranes are damaged / Increased permeability ✓  
- allows blood cells through which are larger than proteins ✓ (2)
- 1.5.4 -The immune system must be prevented ✓  
- from producing antibodies ✓  
- as these destroy the basal membrane of the glomerulus ✓ (3)  
(7)

**TOTAL QUESTION 1: 60**  
**TOTAL SECTION A: 60**

**SECTION B****QUESTION 2****2.1**

- 2.1.1 A: White matter✓  
B: Grey matter✓  
C: Central canal / Cerebrospinal fluid✓ (3)

- 2.1.2 - By three meninges✓  
- it is inside the bony vertebrae ✓  
- cerebrospinal fluid✓ **Mark first 2 answers only** (2)  
**(5)**

**2.2**

- 2.2.1 B: Semi-circular canals✓  
G: Auditory meatus/canal✓ (2)

- 2.2.2 C: Transmits pressure waves to the perilymph of the inner ear✓  
E: Prevents pressure build-up of sound waves / distortion / eases vibrations out of the inner ear/ absorbs vibrations✓ (2)

- 2.2.3 (a) - A buzzing sound is caused by a difference in the pressure between the outer and the middle ear.✓  
- Swallowing opens / closes the Eustachian tube ✓  
- to equalise the pressure✓ (3)
- (b) - To amplify✓  
- sound✓ (2)

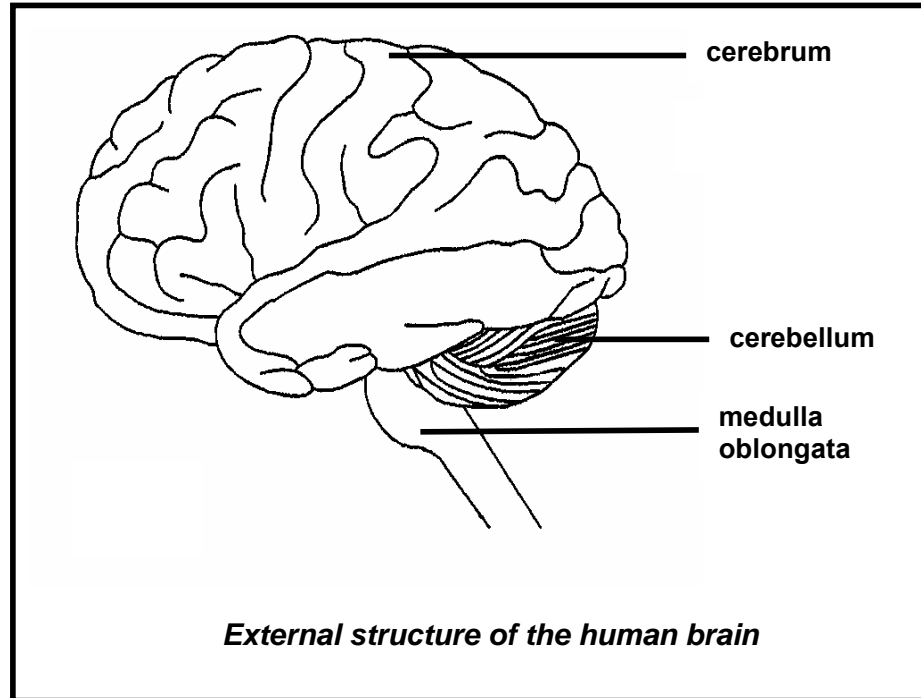
- 2.2.4 (a) No✓ (1)
- (b) It is not moveable or flexible✓  
for more accurate collection of sound / for finding the direction that the sound is coming from ✓ (2)

- 2.2.5 - Both receive ✓stimuli✓  
- and convert✓to impulses ✓  
- which they send✓through the sensory neuron ✓ Any (2 x 2) (4)

- 2.2.6 - Larger surface area✓  
- to accommodate more receptors ✓  
- fits into smaller area / takes up less space✓ Any 2 (2)  
**(18)**

## 2.3

## 2.3.1



Quality of lines (1)

Cerebrum much larger than cerebellum (1)

Three correct labels (3)

(5)

2.3.2 (a) medulla oblongata ✓

(1)

(b) cerebellum ✓

(1)

(c) cerebrum ✓

(1)

(8)

## 2.4

- In bright light the pupil size was small ✓

- to reduce the amount of light entering the eye ✓

- Now in dimly lit room the pupil size has to increase ✓

- to increase the amount of light entering the eye ✓

(4)

**TOTAL QUESTION 2: 35**

**QUESTION 3****3.1**

- 3.1.1 Hypophysis / Pituitary ✓ (1)
- 3.1.2 Mouse I ✓ (1)
- 3.1.3 - Growth hormone (GH) / Somatotrophic hormone (STH) ✓ (1)
- 3.1.4 - For the same time period ✓  
- it showed a greater increase in mass ✓ (2)
- 3.1.5 Fourth / 4<sup>th</sup> ✓ month ✓ (2)
- 3.1.6 (a) - Lower temperature ✓ for either of the mice  
- will cause more food to be oxidized / increased metabolic rate ✓ and  
less food will be available for growth (2)
- (b) - Less food ✓ available for either of the mice  
- will lead to a smaller body mass since food is used ✓ for growth
- OR**
- Different food types ✓  
- contribute differently to the growth ✓ of an organism (2)
- 3.1.7 - One of the target organs of GH is bone ✓  
- Bone length cannot be increased ✓ in adult mice  
- because bone growth has stopped ✓
- OR**
- One of the target organs of GH is bone ✓  
adult mice don't need ✓ to grow any more ✓ (3)
- (14)**

**3.2**

- 3.2.1 - More blood needed by muscles ✓  
- to provide sufficient oxygen ✓  
- and glucose ✓  
- for oxidation to provide energy. ✓  
- The arterioles in the skin are thus constricted ✓  
- causing less blood to reach the skin ✓
- OR**
- Nervous ✓  
- therefore adrenalin produced ✓  
- therefore less blood to skin ✓  
- more blood to muscles ✓
- Any 4 (4)

- 3.2.2 - Increased respiration/oxidation ✓ during race  
 - generates a large amount of heat. ✓  
 - The arterioles in the skin dilate ✓  
 - to allow more blood with heat ✓ to reach the skin  
 - so that excess heat can be lost to the environment ✓

Any 4

(4)  
(8)

## 3.3 3.3.1

	Spectator	Athlete
(a)	Contracted ✓	Relaxed ✓
(b)	More ✓	Less ✓
(c)	Less ✓	More ✓

✓ for table

(7)

- 3.3.2 - Athlete sweats more ✓  
 - to use more body heat ✓ to evaporate sweat  
 - in order to cool down the body/lower the body temperature ✓

**OR**

- Spectator sweats less ✓  
 - therefore less body ✓ heat used to evaporate sweat  
 - because he is less active/his body temperature is not very high ✓

(3)

- 3.3.3 - Radiation ✓  
 - Convection ✓  
 - Evaporation ✓  
 - Urination ✓  
 - Defecation ✓  
 - Expiration / Breathing ✓

**Mark first 3 answers only**

(3)

(13)

**TOTAL QUESTION 3: 35**

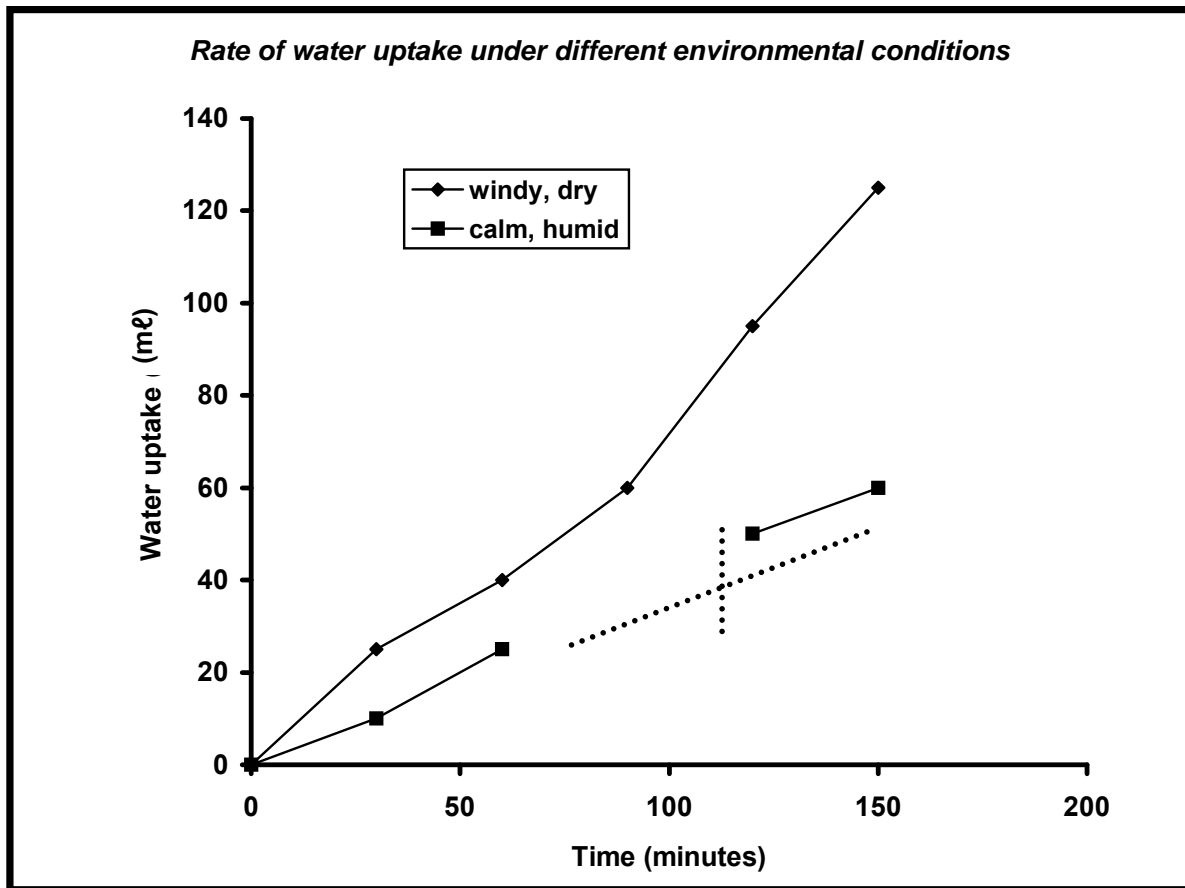
**QUESTION 4****4.1**

- 4.1.1 - Large vacuole ✓  
- Elongated / thin root hair cell ✓  
- Large / increased surface area ✓  
Any 2 (2)  
**Mark first 2 answers only**
- 4.1.2 - Water moves from high  $\Psi$  ✓ in the soil  
- through the permeable cell wall ✓ by diffusion ✓  
- through the differentially permeable cell membrane / cytosol /  
tonoplast ✓ by osmosis ✓  
- to a low  $\Psi$  ✓ in the vacuole  
Any 5 (5)
- 4.1.3 - Water moves out of the cell / exosmosis ✓  
- vacuole shrinks ✓  
- cytoplasm moves away from surrounding cell wall ✓ (3)
- 4.1.4 Plasmolysis ✓ (1)
- 4.1.5 Movement of water molecules slowed down ✓  
decrease in kinetic energy therefore less movement ✓  
Any 1 (1)  
**Mark first answer only (12)**

**4.2**

- 4.2.1 - Windy dry conditions ✓ (1)
- 4.2.2 
$$\frac{(25 + 40 + 60 + 95 + 125)}{5} \checkmark$$
  
$$= 69 \checkmark \text{ ml} \checkmark$$
 (4)
- 4.2.3 Faster air movements remove water vapour faster / greater water  
potential gradient ✓  
**Mark first answer only (1)**

4.2.4



Marking rubric for graphs

Two line graphs on same system of axes

Correct type of graph	1		
Title of graph	1		
Correct label for X-axis including correct units	1		
Correct label for Y-axis including correct units	1		
Appropriate scale for X-axis	1		
Appropriate scale for Y-axis	1		
Plotting of points for graph 1	2: plotted 3 or more of the points correctly	1: plotted 1-2 of the points correctly	0: no points plotted
Plotting of points for graph 2	2: plotted 3 or more of the points correctly	1: plotted 1-2 of the points correctly	0: no points plotted
Label/key for graph 1	1		
Label/key for graph 2	1		
All plotted points joined	1		

Two sets of axes used: Mark first graph only.

Wrong type of graph drawn: marks lost for "correct type of graph" as well as for plotting of points

Transposition of axes: marks will be lost for labelling of axes but marks will be awarded for plotting and joining of points if correctly done.

(13)

4.2.5 37 to 39✓ ml✓

(2)

- 4.2.6
- Same species of plant✓
  - Same time of the day✓
  - Same number of leaves✓
  - Same size plant ✓
  - Same amount of light ✓

Any 2 (2)

**Mark first 2 answers only (23)****TOTAL QUESTION 4: 35**  
**TOTAL SECTION B: 105**

**QUESTION 5**

**5.1**

5.1.1 315 - 320✓ mg/min ✓ (2)

5.1.2 2,0 to 2,3 ✓ g/dm<sup>3</sup> ✓  
OR  
>2,0 ✓ g/dm<sup>3</sup> ✓ (2)

5.1.3 - Shortage of insulin✓  
- in diabetic✓ people  
- results in not all glucose being converted to glycogen✓  
- therefore higher concentration of glucose in blood✓  
- allowing large amounts of glucose to be filtered✓  
- and not all the glucose re-absorbed from the filtrate✓ Any 5 (5)

5.1.4	Smaller ✓	Larger ✓	Larger ✓ (1)
5.1.5	- More glucose in collecting duct means excess glucose in blood✓ - that lowers the water potential of the blood ✓ - more water is re-absorbed into the blood✓ Any 2	- Dissolved glucose lowers $\Psi$ in collecting duct ✓ - therefore less water ✓ - moves out of collecting duct ✓ Any 2	- presence of glucose means a person is diabetic ✓ - diabetics produce lots of urine ✓ (2)

5.1.6 Proximal✓ convoluted tubule (1)

5.1.7 - More H<sup>+</sup> (hydrogen ions) / NH<sub>4</sub><sup>+</sup> (ammonium ions) ✓  
- are excreted from the blood into the lumen of renal tubules✓  
- and more bicarbonate ions (HCO<sub>3</sub><sup>-</sup>)✓  
- are re-absorbed into the blood✓ (4)  
**(17)**

**5.2**

- Osmoregulation is the control of the water content in the body ✓
- The body will dehydrate if water is lost ✓
- and most of the biochemical processes ✓
- in the body will be affected. ✓
- Lots of water/ up to 99% of water is in the filtrate ✓
- that is why most of this water must be retrieved/ reabsorbed. ✓
- Passive reabsorbtion of water ✓ mainly takes place from
- the proximal convoluted tubule ✓
- and the distal convoluted tubule. ✓
- Sodium ions are actively pumped out of the filtrate ✓
- Chlorine ions passively follow the sodium ions ✓
- at the loop of Henle. ✓
- This creates a water potential gradient / low  $\Psi$  in the tissue fluid

- surrounding the collecting ducts. ✓
- The osmoreceptor cells ✓
- in the hypothalamus ✓
- will stimulate the hypophysis ✓
- to secrete ADH ✓
- which is transported by the blood ✓
- to the collecting ducts ✓
- which become more permeable to water. ✓
- Water moves out of the collecting ducts and distal convoluted tubules ✓
- by osmosis. ✓
- Concentrated urine is excreted. ✓

### Assessing the presentation of the essay

Marks	Level description
0	Did not attempt the question.
1	The key concepts are used randomly to answer the essay and more explanation is needed. There are significant gaps in the logic or flow of the answers. The answer is meaningless.
2	Most of the key concepts are organised in a rather superficial way. There are minor gaps in the logic or flow of the answer. The learner does not demonstrate that he/she is in full control of the relevant subject content.
3	The answer is phrased very logically and is well structured. The key concepts are explained in such a way that the answer demonstrates an insight and understanding of the relevant subject content/ question.

**Content:** 15  
**Synthesis:** 3  
(18)

**TOTAL QUESTION 5:** 35  
**TOTAL SECTION C:** 35

**GRAND TOTAL** 200