



education

Department:
Education
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE EXAMINATION – 2008

BIOLOGY P1

HIGHER GRADE

MAY/JUNE 2008

MEMORANDUM

MARKS: 200

This memorandum consists of 13 pages.

PRINCIPLES RELATED TO MARKING HG & SG BIOLOGY 2008

This document should be attached to all memoranda; to all updated guidelines that are distributed in 2008 and made available to ALL Life Sciences teachers early in 2008.

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 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, etc.) must have a caption.
18. If you have doubts consult the other language memo. If still in doubt 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 appearing 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 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 ONE

1.1

1.1.1 B ✓✓

1.1.2 D ✓✓

1.1.3 C ✓✓

1.1.4 B ✓✓

1.1.5 D ✓✓

1.1.6 A ✓✓

1.1.7 D ✓✓

7 x 2 (14)

1.2

1.2.1 Iron / Fe ✓

1.2.2 Gross Primary Productivity / GPP ✓

1.2.3 Maltose ✓

1.2.4 Oxygen ✓

1.2.5 Palisade ✓ mesophyll

1.2.6 Turbinate bones ✓ (6)

1.3

1.3.1 None ✓✓

1.3.2 Both A and B ✓✓

1.3.3 A only ✓✓

1.3.4 B only ✓✓

1.3.5 A only ✓✓

1.3.6 B only ✓✓

6 x 2 (12)

1.4

1.4.1 X – To test for the presence of starch ✓

Y – To test for the presence of glucose ✓ / reducing sugar

Z – To test for the presence of fats ✓ (3)

1.4.2 Blue-black ✓ / purple (1)

1.4.3 To speed up the chemical reaction ✓✓ / To allow the reagent to react with the substance (2)

1.4.4 (a) An oily ✓ / fatty / translucent stain obtained on filter paper ✓ (2)

(b) Fat ✓ is soluble in ether ✓ / ether dissolves fat Any 1 x 2 (2)
(Mark first ONE only)

1.5

1.5.1 To show the influence of light intensity ✓ on the rate of gas bubbles produced during photosynthesis ✓ / on the rate of photosynthesis (2)

1.5.2 oxygen ✓ / O₂ (1)

1.5.3 It increases the supply of carbon dioxide in the water ✓ (1)

1.5.4 The number of bubbles released per minute increases ✓ as the light intensity increases ✓ / rate of photosynthesis increases and eventually the number of gas bubbles released per minute remains constant ✓ when optimum temperature ✓ / light intensity is reached

OR

The number of bubbles per minute increases rapidly ✓ at first as light intensity increases ✓ / photosynthesis rate increases. Then the rate of increase slows down ✓ and eventually the number of gas bubbles released per minute remains constant ✓ when optimum light intensity / temperature is reached. ✓

Any 4 (4)

1.5.5 Set up the same apparatus, but place it in the dark ✓ ✓ / remove the light source / place a box over the apparatus (2)

1.6

1.6.1 1,4 ✓ mg/cm³ ✓ (2)

1.6.2 As blood glucose increases ✓, the insulin level also increases ✓ to reduce the glucose level in the blood ✓

OR

As blood glucose decreases ✓, the insulin level also decreases ✓ to increase ✓ / maintain the glucose level in the blood (3)

1.6.3 Glucagon ✓ is secreted to convert glycogen ✓ into glucose ✓ (3)

TOTAL SECTION A (60)

SECTION B**QUESTION TWO**

2.1

- 2.1.1 (a) Food type I ✓ - contains a high number of carbohydrates. ✓✓ (3)
 (b) Food type III ✓ - contains a lot of carbohydrates but no proteins. ✓✓ (3)

2.1.2 25 ✓ % ✓ (2)

2.2

2.2.1 X - mitochondrion ✓
 Y - chloroplast ✓ (2)

2.2.2 (a) cellular respiration ✓
 (b) photosynthesis ✓ (2)

2.2.3 (a) carbon dioxide ✓ /CO₂
 (b) oxygen ✓ /O₂
 (c) carbon dioxide ✓ /CO₂
 (d) oxygen ✓ /O₂ (4)

2.2.4 Chlorophyll ✓ (1)

2.2.5 Absorbs light energy ✓ (1)

2.2.6 Dark phase ✓
 A series of reactions during which energised hydrogen ✓ and energy from ATP ✓ from the light phase become combined with carbon dioxide ✓ from the atmosphere which are then converted to sugar and starch ✓
 Any 4 (4)

2.2.7 - Glucose and other carbohydrates are made available to all organisms ✓
 - Carbon dioxide is absorbed ✓ to keep the carbon dioxide level constant
 - Large amounts of oxygen are released ✓
 - Light energy is converted into chemical energy ✓
 - Derives fossil fuels such as coal and oil ✓
 Any 3 (3)

2.3

2.3.1 To investigate whether heat energy✓ is released during respiration✓
by germinating seeds (2)

2.3.2 (a) To allow for gaseous exchange✓✓ / O₂ to enter✓ and
CO₂ to escape✓ (2)

(Mark first ONE only)

(b) To prevent bacteria and fungi from growing✓✓ /releasing heat /
respiring (2)

(Mark first ONE only)

(c) The heavy CO₂ sinks and is able to escape✓✓/ to obtain a
reading on the thermometer✓✓/ to trap heat ✓✓ (2)

(Mark first ONE only)

2.3.3 Carbon dioxide✓ (1)
(Mark first ONE only)

2.3.4 Temperature will increase✓ (1)

TOTAL QUESTION 2: (35)

QUESTION THREE

3.1

3.1.1 Decrease oxygen concentration ✓ (1)

3.1.2 Respire anaerobically ✓/Reduced respiration rate (1)

3.1.3 carbon dioxide ✓
lactic acid ✓
little energy ✓
alcohol ✓ (3)
(Mark first THREE only)

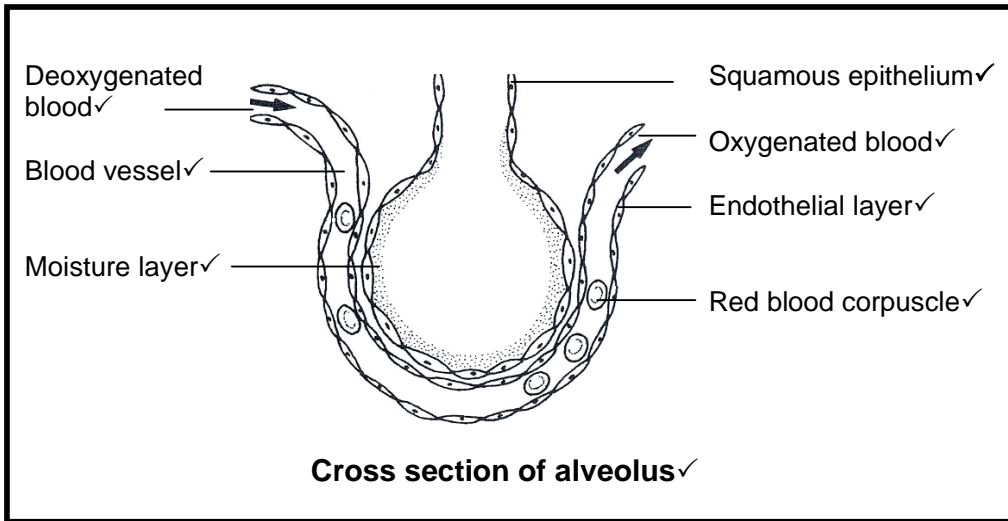
Any 3

3.2

3.2.1 B - bronchus ✓
F - cilia ✓
G - goblet cell ✓ (3)

3.2.2 (a) A - remains open ✓/strengthened to allow for free movement of air ✓ (2)
(b) D - Diaphragm relaxes ✓ / becomes arched inwards/ dome-shaped/
more convex to reduce the volume of the thoracic cavity ✓ (2)

3.2.3



Caption ✓
Shape of the alveoli ✓
Any 4 labels ✓✓✓✓ (6)

3.2.4

Smoker	Non-smoker
- Mucous layer is thicker✓ - Diameter of trachea is narrowed✓/ reduced/ decreased - Cilia are stuck together ✓	- Mucous layer is thin✓ - Diameter of trachea is wider✓ / increased - The cilia are free ✓

(Mark first TWO only)

4 + 1 for table = (5)

- 3.2.5. - Opening is narrow✓ therefore less✓ air will move in
- Cilia are stuck together✓ therefore air will not be cleaned properly/mucous not removed✓

Any 1 x 2 (2)

3.3

- 3.3.1 A = Lacteal✓ (1)
B = Crypt✓ of Lieberkühn (1)
C = Lymph vessel✓ (1)

- 3.3.2 - Absorbs fatty acid and glycerol✓/ fats
- Transports fatty acid and glycerol✓/fats

Any 1 (1)

- 3.3.3 (a) Lipase✓ (1)
(b) Glycerol✓ and fatty acids✓ (2)

- 3.3.4 Fatty acids combine with bile salts✓ in columnar epithelium✓
Glycerol diffuses✓ through columnar epithelium.
Glycerol and fatty acids combine to form fat droplets✓ before being absorbed into the lacteal/part A✓

Any 3 (3)

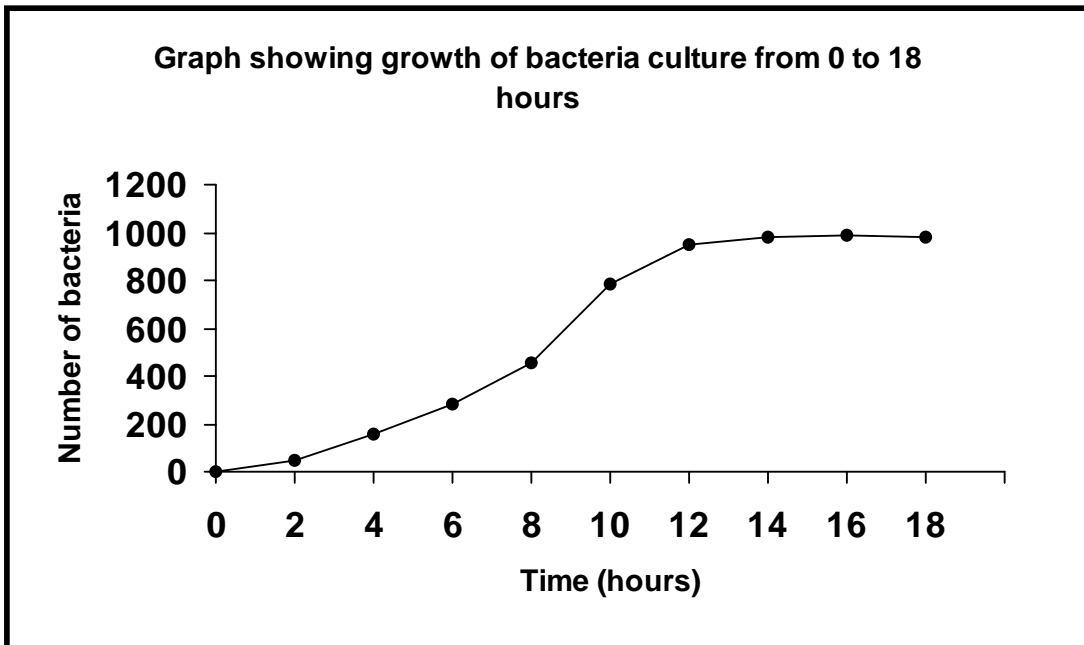
TOTAL QUESTION 3: (35)

QUESTION FOUR

- 4.1 – Increase in the concentration of carbon dioxide ✓ in the body of the soccer player
- Sensory cells/chemo-receptors ✓ in the carotid arteries are stimulated ✓
 - impulses ✓ are sent to the cardiovascular ✓ and respiratory centre ✓ in the medulla oblongata ✓
 - the medulla oblongata sends impulses to the heart causing it to beat faster ✓
 - CO₂ is carried at a faster rate ✓ from the tissues to the lungs
 - the medulla also sends impulses to the breathing muscles ✓ / intercostal muscles, diaphragm and abdominal muscles, which speeds up the breathing rate ✓ and CO₂ is released faster.

Any 7 (7)

4.2
4.2.1



Rubric for the mark allocation of the graph

Correct type of graph	1			
Title of graph	1			
Correct choice for X- and Y-axis	1			
Correct label and unit for X-axis	1			
Correct label and unit for Y-axis	1			
Appropriate scale for X-axis (constant intervals)	1			
Appropriate scale for Y-axis (constant intervals)	1			
Plotting points	3: plotted all 10 points correctly	2: plotted 7 or more of the points correctly	1: plotted 6 or fewer of the points correctly	0: no points plotted
All plotted points joined	1			

(11)

4.2.2 (a) Lag phase✓ / establishment phase
Bacteria adapting to environment ✓✓/ not enough mating partners (3)

(b) Geometric phase✓ / logarithmic / exponential/accelerating growth phase
Bacteria population increase rapidly ✓✓/ there is no limitation
on mating partners / little or no environmental resistance (3)

4.2.3 Density-dependent✓ factor – since competition for the same resources
is dependent on the number✓✓/density of bacteria (3)

4.2.4 980✓ (1)

4.3

4.3.1 Area = L x B
= (40 m x 20 m) ✓ = 800✓ m²✓ (3)

4.3.2 Total number of cacti = No. of cacti x $\frac{\text{Habitat area}}{\text{Sample area of 4 quadrats}}$
in 4 sample areas
= (4+2+4+2) or 12✓ X $\frac{800 \text{ m}^2 \checkmark}{4 \text{ m}^2 \checkmark} / 200$
= 2400✓ cactus plants (4)

TOTAL QUESTION 4: (35)

SECTION C**QUESTION 5**

5.1

- 5.1.1 (a) 200✓ g
(b) 350✓g (2)
- 5.1.2 (a) Rats lose / decrease✓ in body mass/weight (1)
(b) Rats gain / increase✓ in body mass/weight/growth (1)
- 5.1.3 Yes ✓/Amino acid A (1)
Protein Z is given in the diet for both groups, but group 1's body mass decreased.✓✓/Therefore growth in Group 2 can only be due to amino acid A. (2)
- 5.1.4 To improve the eyesight✓/ for good vision/ to prevent night blindness (1)
- 5.1.5 Calcium/Ca✓ and Phosphorus/P✓ (2)
(Mark first TWO only)
- 5.1.6 water✓/roughage (1)
(Mark first ONE only)
- 5.1.7 Source of reserve energy✓
Enzymes which regulate reactions are proteins✓
Hormones are proteins✓
Structural component of protoplasm, cell membranes and chromosomes✓
Haemoglobin which transports oxygen in blood is a protein✓
Antibodies which protect the body are proteins✓
Some proteins act as buffers (amphoteric)✓
(Mark first THREE only) (3)
- 5.1.8 Excess amino acids✓are converted into glucose✓and urea✓ (3)

5.2

The digestion of proteins starts in the stomach✓, where gastric juice✓ contains inactive pepsinogen✓
Pepsinogen is activated by hydrochloric acid✓ to form pepsin✓
Pepsin digests proteins✓ to polypeptides✓.

Max 5

The pancreas✓ secretes pancreatic juice✓ which contains inactive trypsinogen✓ and chymotrypsinogen✓
Enterokinase✓ activates trypsinogen into trypsin✓
Trypsin digests proteins✓ into polypeptides✓ and amino acids✓
Trypsin also activates chymotrypsinogen into chymotrypsin✓ and
Chymotrypsin converts polypeptides✓ into amino acids✓.

Max 5

Small intestine✓ wall secretes succus entericus ✓/ intestinal juice which contains enterokinase, peptidases✓ and erepsin✓
Peptidase converts peptides✓ into amino acids✓
Erepsin converts polypeptides and peptones✓ into amino acids✓

Max 5

Any 15 (15)

Synthesis:

Marks	Descriptions
3	Well structured - demonstrates insight and understanding of question
2	Minor gaps in the logic and flow of the answer
1	Attempted but with significant gaps in the logic and flow of answer
0	Not attempted/nothing written other than question number

(3)

TOTAL SECTION C: (35)
GRAND TOTAL: 200