



Province of the
EASTERN CAPE
EDUCATION

**NATIONAL
SENIOR CERTIFICATE**

GRADE 11

NOVEMBER 2014

**LIFE SCIENCES P1
MEMORANDUM**

MARKS: 150

This memorandum consists of 9 pages.

SECTION A**QUESTION 1**

- 1.1 1.1.1 B ✓✓
1.1.2 D ✓✓
1.1.3 C ✓✓
1.1.4 D ✓✓
1.1.5 B ✓✓
1.1.6 D ✓✓
1.1.7 D ✓✓
1.1.8 A ✓✓
1.1.9 A ✓✓ (9 x 2) (18)
- 1.2 1.2.1 Larynx ✓
1.2.2 Erythrocytes/red blood cells ✓
1.2.3 Global warming ✓
1.2.4 Carrying capacity ✓
1.2.5 Dispersal ✓
1.2.6 Population ✓
1.2.7 Chloroplasts ✓
1.2.8 Lactic acid ✓ (8 x 1) (8)
- 1.3 1.3.1 B only ✓✓
1.3.2 A only ✓✓
1.3.3 Both A and B/Both ✓✓
1.3.4 B only ✓✓
1.3.5 Both A and B/Both ✓✓
1.3.6 A only ✓✓
1.3.7 None ✓✓
1.3.8 A only ✓✓
1.3.9 B only ✓✓ (9 x 2) (18)

- 1.4 1.4.1 X = CO₂ ✓ Y = O₂ ✓ (2)
- 1.4.2 Diffusion ✓ (1)
- 1.4.3
- In the form bicarbonate ions. ✓
 - In the form of carbaminohaemoglobin. ✓
 - In the blood plasma as dissolved gas. ✓
- (Any 2 x 1) (2)
- 1.4.4 Haemoglobin ✓ (1)

TOTAL SECTION A: 50

SECTION B**QUESTION 2**

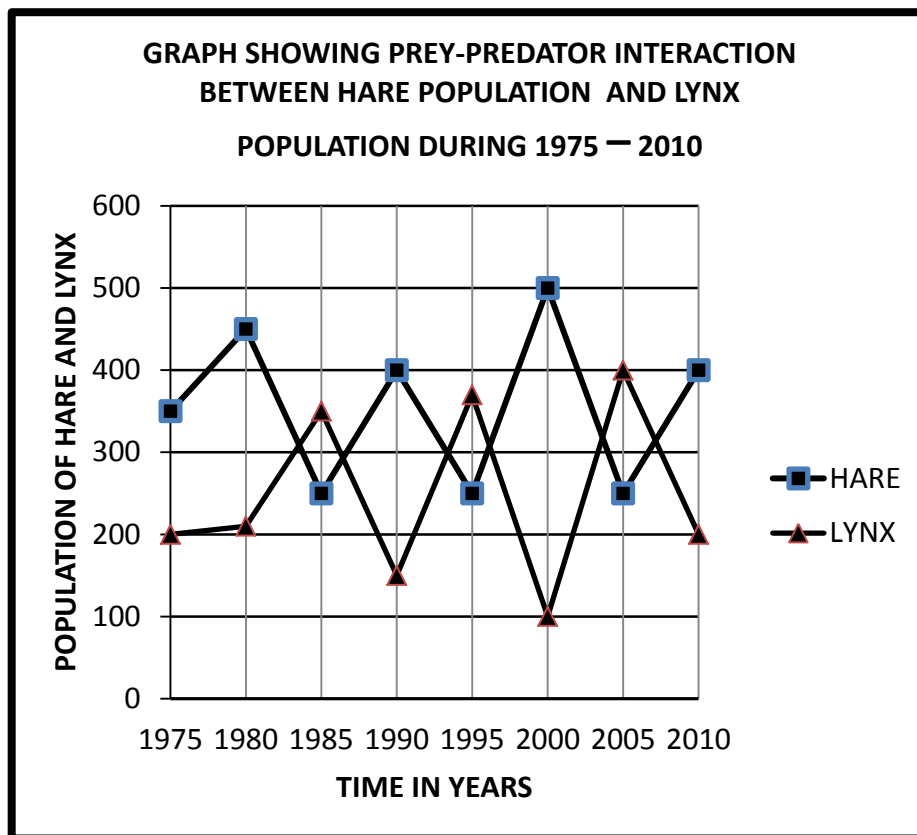
- 2.1 2.1.1 Phase 1 – Glycolysis ✓
Phase 2 – Krebs's cycle ✓
Phase 3 – Oxidative phosphorylation ✓ (3)
- 2.1.2 X – Glucose ✓
Y – Oxygen ✓ (2)
- 2.1.3 X – Intake of food. ✓ (end-product of carbohydrate digestion)
Y – Inhalation of oxygen ✓ (2)
- 2.1.4 Product 1 – CO₂ ✓
Product 2 – Highly energised hydrogen atoms ✓
Product 3 – Water ✓ (3)
- 2.2 2.2.1 B ✓ (1)
- 2.2.2
- During the inhalation process, the diaphragm contracts ✓ and becomes less convex (flattens downward) increasing the volume of the thorax from top to bottom. ✓
 - The external intercostals muscles contract ✓ and lift the ribs up and outward, increasing the volume of the thorax from front to back. ✓
 - This causes the thoracic cavity to be enlarged from side to side and from back to front. ✓
 - The total volume of the thoracic cavity increases ✓ and pressure on the lungs (interpleural pressure) decreases. ✓
 - Since the atmospheric pressure is greater than the pressure on the lungs, ✓ air rich in oxygen is drawn in through the air passages into the lungs. ✓ (Any 6 x 1) (6)
- 2.2.3 Glass tube – Trachea ✓
Bell jar – Thoracic cavity/thorax ✓
Rubber sheet – Diaphragm ✓ (3)
- 2.2.4 The balloon would not inflate. ✓ This is because the hole in the rubber sheet causes the pressure within the bell jar to become equal to the atmospheric pressure. ✓ (2)

- 2.3 2.3.1 300 ✓ mg/100 cm³ (1)
- 2.3.2 (a) 2 hours 30 minutes/150 minutes ✓✓ (2)
- (b) 3 hours 30 minutes/210 minutes ✓✓ (2)
- 2.3.3 Regular injections of insulin would lower the blood glucose concentration of the diabetic to normal. ✓
- OR**
- it will also shorten the time it takes for the blood glucose concentration to return to normal after ingestion. ✓ (1)
- 2.3.4 Glycogen ✓ (1)
- 2.3.5 Insulin is a protein and therefore, digested in the human digestive system. ✓ It would therefore not be absorbed as insulin, but as its amino acids. ✓ (2)
- 2.4 2.4.1 Structure of a villus ✓ (1)
- 2.4.2 Small intestine ✓ (1)
- 2.4.3 Absorption of digested nutrients ✓ (1)
- 2.4.4 C – Large amounts of glucose ✓ and amino acids ✓ (2)
- 2.4.5 A – Columnar epithelium ✓
B – Lacteal ✓ (2)
- 2.4.6
- The thin columnar epithelium ✓ of the villus enhance easy absorption of nutrients across membrane by means of diffusion. ✓
 - The columnar epithelial cells have a brush border or microvilli ✓ on the free surface to enlarge the surface area for absorption. ✓
 - The columnar epithelial cells produce carrier molecules, ✓ which facilitate active absorption of nutrients against diffusion gradients. ✓
 - The goblet cells ✓ between the columnar epithelial cells secrete watery mucus that prevents friction and keeps the cells moist. ✓
 - The villi contain many capillary blood vessels and lacteals in close contact ✓ with the absorption surface to take the absorbed food away fast and therefore, maintain steep concentration gradients for fast diffusion. ✓ (Any 1 x 2) (2)

[40]

QUESTION 3

3.1 3.1.1

**Checklist for the mark allocation of the graph**

Correct type of graph with points joined	1
Title of graph	1
Correct label for X-axis	1
Correct label for Y-axis	1
Appropriate scale for X-axis and Y-axis	1
Plotting points	1 mark: 4–8 points plotted correctly 2 marks: 9–16 points plotted correctly

NOTE

If the wrong type of graph is drawn:

- Marks will be lost for 'correct type of graph'

If axes are transposed:

- Marks will be lost for labelling of X-axis and Y-axis

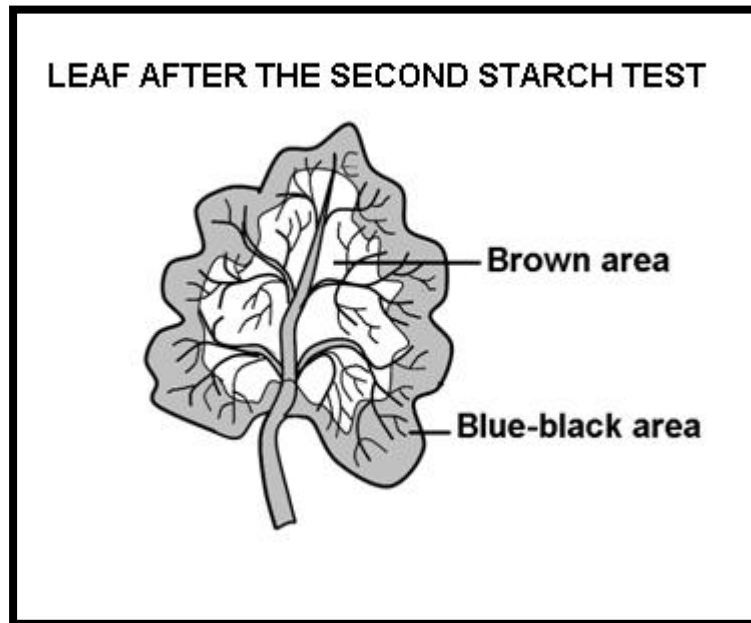
(7)

3.1.2 Lag phase/Establishment phase ✓

(1)

- 3.1.3
- Slow growth. ✓
 - Predators are still adapting to new environment/ acclimatisation. ✓
 - Finding partners is difficult. ✓
 - Organisms have not reached reproductive age/young population. ✓
- (Any 2 x 1) (2)
- 3.1.4
- By feeding on the hare population, the lynx population reduce the number of their prey. ✓
 - As the number of hare population(pre) drops ✓
 - more competition ✓ among the lynx (predator) population prevails.
 - Thus resulting in a decrease ✓ in the number of predators
 - and an increase ✓ in the number of hare population and a corresponding increase ✓ in the lynx (predator) population.
 - Finally the size prey-predator population stabilises ✓ under the carrying capacity ✓ of the habitat resulting in a stable population. ✓
- (Any 4 x 1) (4)
- 3.1.5
- $$\frac{(400 - 250) \times 100}{400} = \frac{150}{4} = 37,5\%$$
- (3)
- 3.2 3.2.1 To determine whether chlorophyll is necessary for photosynthesis. ✓ (1)
- 3.2.2 To destarch the plant. ✓ (1)
- 3.2.3 To ensure that the leaves are completely destarched. ✓✓ (2)

3.2.4



Marking guideline of the diagram:

Criteria	Marks
Caption	1
Correct labels	2
Correct shading	2

(5)

3.2.5 No ✓ (1)

3.2.6 Result obtained from the non-chlorophyllated area ✓ of the leaf can be compared with the result obtained from chlorophyllated area ✓ of the leaf. (2)

3.2.7 Chlorophyll is necessary ✓ for photosynthesis. ✓ (2)

3.3 3.3.1 Photosynthesis ✓ (1)

3.3.2 Algae ✓ (1)

3.3.3 Organic matter ✓ and oxygen ✓ (2)

3.4 3.4.1 A – Anorexia nervosa ✓
B – Kwashiorkor ✓
C – Obesity ✓ (3)

3.4.2 B – Lack of protein in the diet ✓
C – Excessive intake of energy-rich food ✓ (2)

[40]**TOTAL SECTION B: 80**

SECTION C**QUESTION 4**

- The effect of drinking a lot of liquid will be to make the blood and body fluids more dilute than usual. ✓
- When the water content of the body is above normal ✓
- the osmotic potential of the blood decreases ✓
- which signals osmoreceptors in the hypothalamus ✓ that produces ADH ✓
- to transmit impulses to the hypophysis to release less ADH in to the blood ✓
- Therefore, less ADH reaches the kidney and causes a decrease ✓ in the permeability ✓ of the walls of the
- distal convoluted tubule and collecting duct ✓
- less water is reabsorbed from the filtrate ✓
- and a large amount of diluted urine is excreted ✓
- The adrenal glands secrete less aldosterone ✓
- which causes less sodium ions to be actively pumped out of the filtrate ✓
- in the ascending limb of loop of Henle ✓
- into the tissue fluid of the kidney medulla
- This creates a high water potential or less negative osmotic potential ✓
- Therefore, less water is reabsorbed ✓ from the nephron tubule into the tissue fluid of the medulla ✓
- That means more water will be excreted as urine.

Content (17)
Synthesis (3)

Assessing the presentation of the essay

Criterion	Relevance (R)	Logical sequence (L)	Comprehensive (C)
Generally	All information provided is relevant to the topic.	Ideas are arranged logical/ cause – effect sequence	All aspects required by the essay have been sufficiently addressed
In this essay	Only information relevant to homeostasis (Osmoregulation) is given (There are no irrelevant information).	Generally various structures and their coordinated functioning towards achieving correct amount of water in the body are discussed.	Role of hypophysis, adrenal gland and the effect of their hormones on the target structure of the kidney are thoroughly discussed.
Marks	1	1	1

TOTAL SECTION C: 20
GRAND TOTAL: 150