



Province of the
EASTERN CAPE
EDUCATION

**NATIONAL
SENIOR CERTIFICATE**

GRADE 11

NOVEMBER 2011

**LIFE SCIENCES P1
MEMORANDUM**

MARKS: 150

This memorandum consists of 10 pages.

SECTION A:

QUESTION 1

- 1.1 1.1.1 D ✓✓ (2)
 1.1.2 B ✓✓ (2)
 1.1.3 D ✓✓ (2)
 1.1.4 B ✓✓ (2)
 1.1.5 D ✓✓ (2)
- 1.2 1.2.1 Osteoporosis ✓ (1)
 1.2.2 Biofuel ✓ (1)
 1.2.3 Capillary ✓ (1)
 1.2.4 Biodegradable ✓ (1)
 1.2.5 Conservation ✓ (1)
- 1.3 1.3.1 Both (A and B) ✓✓ (2)
 1.3.2 None ✓✓ (2)
 1.3.3 A only ✓✓ (2)
 1.3.4 B only ✓✓ (2)
 1.3.5 A only ✓✓ (2)
- 1.4 1.4.1 *Portulacaria afra* ✓ (1)
 1.4.2 Ability to absorb and store CO₂ at a rate of four tons per hectare per annum. ✓ (1)
 1.4.3 $\frac{40\,000}{4} \checkmark = 10\,000 \checkmark \text{ hectares}$ (2)
 1.4.4
 - Job creation ✓
 - Substantial capital investment in the region. ✓
 - Publicity and international recognition ✓
 - Skills development ✓
 - Possible improvement of infrastructure and local economy. ✓
 - Possible income generated from international carbon market. ✓
 (Any 2) (2)
 1.4.5
 - Improved pastures ✓
 - Sustainable access to fuel wood, timber, fruits and medicines. ✓
 - Prevention of soil erosion ✓
 - Reclamation of degraded land. ✓
 - Part of the revenue can be ploughed back to support other green projects in the region. ✓
 (Any 2) (2)
 1.4.6
 - Projected income from international carbon trading is not tested before. ✓
 - Possible maladministration and corruption ✓
 - Lack of public awareness ✓
 - Restoration of one species is regarded as monoculture. ✓
 - Possible threat to biodiversity of the region. ✓
 - Lack of knowledge and expertise to drive such a project. ✓
 (Any 2) (2)

- 1.5 1.5.1 Death of so many fishes and other aquatic organisms in the river. ✓ (1)
- 1.5.2
- Formulate a hypothesis for testing. ✓
 - Seek expert advice and guidance from relevant people. ✓
 - Decide on a suitable site for sampling. ✓
 - Organise all the required chemicals and equipments before the start of the sampling process. ✓
 - Design a relevant recording sheet. ✓
 - Obtain permission and documentation to enter the area if it is required. ✓
 - Organise gloves, boots, protective clothing and a small raft if possible. ✓
 - Decide on the volume of daily samples, depth at which the sample is collected, time of sample taking. ✓ (Any 2) (2)
- 1.5.3 Sample from Site A is used as a control to compare the variations of pH level at site B. ✓ (1)
- 1.5.4
- The volume of samples taken from both sites. ✓
 - Depth at which the samples are collected. ✓
 - Time at which samples are collected. ✓ (Any 2) (2)
- 1.5.5 If there are little or no variations in the pH level, the hypothesis that highlights the fatal effects of acid contamination on aquatic organisms should be rejected. ✓ Therefore, a new and relevant hypothesis should be formulated for further testing. ✓ (2)
- 1.5.6
- Sewage spills ✓
 - House hold detergents ✓
 - Oil spills ✓
 - Fertilisers ✓
 - Pesticides ✓
 - Weedicides/weed killers ✓
 - Seepage from waste dumps ✓ (Any 2) (2)
- 1.6 1.6.1 Transpiration. ✓ (1)
- 1.6.2 Potometer. ✓ (1)
- 1.6.3 To prevent air bubbles from entering the xylem and blocking the passage of water. ✓ (1)
- 1.6.4 Hot and windy conditions will increase the transpiration rate. ✓ High relative humidity will decrease the transpiration rate. ✓ (2)

TOTAL SECTION A: 50

SECTION B:**QUESTION 2**

- 2.1 2.1.1 Nephron. ✓ (1)
- 2.1.2 1 - Afferent arteriole ✓
2 - Efferent arteriole ✓
7 - Loop of Henle / Ascending limb of loop of Henle. ✓ (3)
- 2.1.3 A - Ultra-filtration ✓
B - Tubular reabsorption ✓
C - Tubular excretion ✓ (3)
- 2.1.4 Malpighian corpuscle (body) ✓ (1)
- 2.1.5 Antidiuretic hormone ✓ (1)
- 2.1.6
- The inner wall of the tubule B is made up of cuboidal cells which have many mitochondria ✓ to generate energy for active reabsorption ✓ of all useful nutrients back in to the blood.
 - Contains many micro-villi ✓ to increase the area of absorption ✓.
 - Long and coiled ✓ to decrease the rate of movement of the filtrate to improve the reabsorption of useful nutrients. ✓
 - Close contact with blood capillaries ✓ to enhance quick absorption and transport of nutrients. ✓ (Any 2 x 2) (4)
- 2.2 2.2.1 Organ transplant is the transfer of an organ from a donor ✓ to a recipient. ✓ (2)
- 2.2.2 $26 + 22 + 25 = 73$ ✓ (2)
- 2.2.3 Donor of a kidney is able to lead a healthy life after the donation ✓ and therefore, it is comparatively easier to find a willing donor. ✓
A heart can only be available from a person who is on a life support system ✓ and he/she dies after donation. ✓ (Any 2) (2)
- 2.2.4 Number of kidney transplants performed in South Africa, ✓ from 2004 – 2009. ✓ (2)
- 2.2.5 Hospital records / internet ✓ (1)

2.2.6 Caption: Number of heart transplants from 2004 – 2009.

Year	Heart transplants
2004	27
2005	27
2006	21
2007	26
2008	22
2009	25

Rubric

Caption	1	(4)
Column headings	1	
Correct entry of data	1	
Draw table	1	

2.2.7 Number of heart transplants \surd – First graph
 Number of kidney transplants \surd – Second graph (2)

2.2.8 Incidence of kidney transplants in South Africa is much higher than that of heart transplants. $\surd\surd$

OR

Incidence of heart transplants in South Africa is much lower than that of kidney transplants. \surd (2)
[30]

QUESTION 3

- 3.1 3.1.1 1 – Scapula ✓
3 – Humerus ✓
4 – Radius ✓
5 – Ulna ✓ (4)
- 3.1.2 6 – Gliding joints ✓
7 – Hinge joint ✓
8 – Ball and socket joint ✓ (3)
- 3.1.3 A – Triceps ✓
B – Biceps ✓ (2)
- 3.1.4 When lower arm is lifted – the biceps contracts and triceps relaxes. ✓
When lower arm is lowered – the triceps contracts and the biceps relaxes. ✓ (2)
- 3.1.5 Osteoarthritis. ✓ (1)
- 3.2 3.2.1 Hydraulic fracturing / Fracking. ✓ (1)
- 3.2.2 90,000 ✓ km² ✓ (2)
- 3.2.3 Fluid is pumped down a drilled channel in to the gas bearing rock ✓ at a high pressure. ✓ This causes the rock to fracture, ✓ creating cracks through which the gas is released and this gas is then collected. ✓ (4)

3.2.4

Agree ✓	Disagree ✓
<ul style="list-style-type: none">• Potential job creation ✓ • Huge capital investment ✓ • Infrastructure development ✓ • Part of revenue can be utilised to support green projects in the area. ✓ • Potential export of gas ✓ • Self-reliance with regard to energy needs and boost South African economy. ✓ • Various skills development ✓ • Improved living condition for poverty stricken area ✓ • Better service delivery ✓ • Any other relevant answers (Any 2 +1)	<ul style="list-style-type: none">• Contamination of ground water ✓ as highly poisonous chemicals are used and some are carcinogenic. • Fracturing bedrocks could possibly lead to the collapse of infrastructure of the area. ✓ • Lead to water shortages ✓ in the area as millions of litres of water will be pumped in to the gas bearing rock. • Use and release of methane gas lead to global warming and eventually climate change. ✓ • Any other relevant answers. <p style="text-align: right;">(Any 2 +1)</p>

(3)

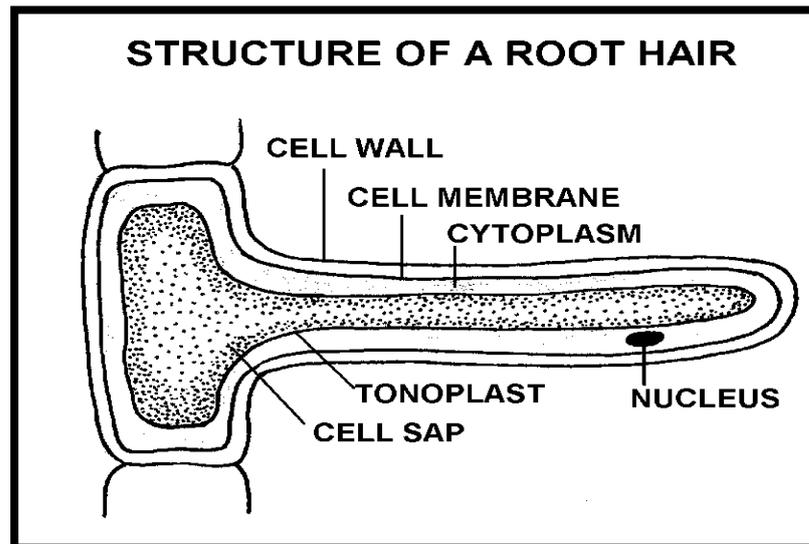
3.3 3.3.1 B - Endodermis ✓

C - Xylem ✓

D - Phloem ✓

(3)

3.3.2

**RUBRIC**

Caption	1
Any three labels	3
Shape and proportion	1

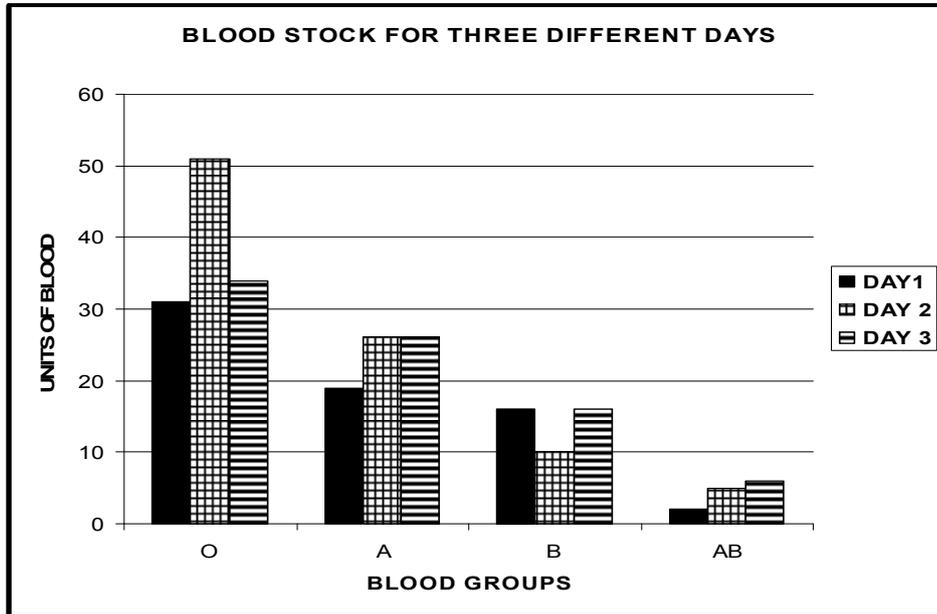
(5)
[30]**TOTAL SECTION B: 60****SECTION C****QUESTION 4**

- 4.1 4.1.1 A – Oxygenated blood ✓ (1)
B – Deoxygenated blood ✓ (1)
- 4.1.2 A – To the rest of the body ✓ (2)
B – To the lungs ✓
- 4.1.3 E ✓ – Superior vena cava ✓
D ✓ – inferior vena cava ✓
C ✓ – Pulmonary vein ✓ (Any 2 combinations) (4)
- 4.1.4 G – Semi-lunar valve ✓ – prevents deoxygenated blood from flowing back to the right ventricle. ✓
F – Sino-atrial node (SA node) ✓ – controls the timing of the heart beat by sending electrical impulses to the muscle fibres of left and right atrium. ✓ (4)

4.1.5 Angioplasty ✓ (1)

4.1.6 Pericardium ✓ (1)

4.2 4.2.1



Rubric

Caption	1
Correct type of graph	1
Correct labels for x-axis	1
Correct labels for y-axis including unit	1
Appropriate scale for y-axis	1
Correct width of columns	1
Drawing of graphs	1 – 1 to 4 bars drawn correctly 2 – 5 to 8 bars drawn correctly 3 – 9 to 12 bars drawn correctly

(9)

4.2.2 $\frac{500}{5000} \times 100 \checkmark = 10\% \checkmark$

(2)

4.3 Possible reasons why alien plants were imported to South Africa.

- Used as wind breaks in farming land. ✓
- For the manufacture of timber products and paper. ✓
- Various plants were imported for agricultural purposes. ✓
- Used in tannery. ✓
- For aesthetic reasons. ✓
- As ornamental plants. ✓
- Support in mines. ✓

(Any 4) (4)

The unfavourable effects of alien plants in South Africa.

- Alien plants out-compete the indigenous plants, causing major changes to the habitats in which they occur and affect the functioning of entire ecosystem. ✓ (They become invasive) e.g. water hyacinth cover the surface of water and block out the sunlight, thus disturbing the food webs in these habitats.
- They cause major damage to biodiversity of the region. ✓
- They are known to use more water than the indigenous plants. ✓
- Increase the risk of soil erosion. ✓
- Invasion of alien plants destroys many beautiful indigenous plants and therefore, reduces the natural beauty of South Africa. ✓
- Decreases natural food resources and habitat of wild animals. ✓ (Any 4) (4)

Strategies to eradicate alien plants

- Mechanical control: ✓ Removal of alien plants by hand or with machines. This method is only effective in controlling small populations and also it minimises possible harm to non-invasive alien plants.
- Chemical control: ✓ Chemical compounds can be used to prevent the spread of alien invasive plants. This method is effective in both large and small areas. This method has the potential of contaminating land and water resources. Furthermore, indiscriminate use of chemicals can harm non-invasive plants as well as other useful animals in that area.
- Biological control: ✓ It involves the release of a specific species to restrict the spread of the invasive plants. The invasive alien plants can be deliberately infected by pathogens to reduce their ability to reproduce.
- Stricter control of imports of alien plants by the government at every port of entry. ✓
- Introduce heavy penalty for importing exotic plants from abroad. ✓
- Regular monitoring and consistent follow-up on the various interventions that are initiated by the municipalities. ✓ (Any 4) (40)

Synthesis

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

TOTAL SECTION C: 40

GRAND TOTAL: 150