

Province of the

**EASTERN CAPE**

EDUCATION

**NATIONAL**

**SENIOR CERTIFICATE**

**GRADE 11**

**NOVEMBER 2010**

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| **LIFE SCIENCES P1**  **MEMORANDUM** |

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| This memorandum consists of 7 pages. |

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| **SECTION A** | | | |  | |
|  |  | | |  | |
| **QUESTION 1** | | | |  | |
|  |  | | |  | |
| 1.1 | 1.1.1 | B √√ | |  | |
|  | 1.1.2 | C √√ | |  | |
|  | 1.1.3 | C √√ | |  | |
|  | 1.1.4 | B √√ | |  | |
|  | 1.1.5 | D √√ | |  | |
|  | 1.1.6 | C √√ (6x2) | | (12) | |
|  |  |  |  |  | |
|  |  | | |  | |
| 1.2 | 1.2.1 | Biodiversity √ | |  | |
|  | 1.2.2 | Osmoregulation√ | |  | |
|  | 1.2.3 | Rheumatoid arthritis√ | |  | |
|  | 1.2.4 | Phloem √ | |  | |
|  | 1.2.5 | Lignin √ | |  | |
|  | 1.2.6 | Collenchyma √ | |  | |
|  | 1.2.7 | Stomata √ | |  | |
|  | 1.2.8 | Ecotourism √ (8x1) | | (8) | |
|  |  |  | |  | |
| 1.3 | 1.3.1 | E √ | |  | |
|  | 1.3.2 | H √ | |  | |
|  | 1.3.3 | G √ | |  | |
|  | 1.3.4 | A √ | |  | |
|  | 1.3.5 | D √ | |  | |
|  | 1.3.6 | C √ | |  | |
|  | 1.3.7 | F √ | |  | |
|  | 1.3.8 | B √ (8x1) | |  | |
|  |  | | |  | |
| 1.4 | 1.4.1 | To investigate the influence of light√ on the rate of transpiration. √ | | | (2) |
|  |  |  | | |  |
|  | 1.4.2 | Potometer √ | | | (1) |
|  |  |  | | |  |
|  | 1.4.3 | * Sunken stomata √ * Thickened cuticle √ * Reduced number of stomata √ * Hairy leaves √ * Reduced surface area of leaves √ * Close arrangement and overlapping of leaves √ * Reflective colouring √ **(Mark first three)** | | | (3) |
|  |  |  | | |  |
|  | 1.4.4 | Temperature √ and humidity.√ wind √ light intensity √ | | | (2) |
|  |  |  | | |  |
|  | 1.4.5 | The rate of transpiration would decrease. √ | | | (1) |

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| 1.5 | 1.5.1 | Western Cape √ | (1) |
|  | 1.5.2 | 2792√ tons √ | (2) |
|  | 1.5.3 | * Pollution and contamination of water sources. √ * Toxic discharge affects aquatic flora and fauna. √ * Decomposing waste gives off bad odours. √ * Medical waste is aesthetically unattractive. √ * It also causes eutrophication. √ * Decrease of oxygen √ **(Mark first three)** | (3) |
|  | 1.5.4 | Plastics take a long time to biodegrade √approximately 50 years, marine animals can die when they become entangled in plastic bags and nets √/if swallowed it can become stuck in an animal’s stomach√ and prevent it from feeling hungry. √ (Any 1) | (1) |
|  | 1.5.5 | Biodegradable waste is waste that can be broken down√ (decomposed) by natural processes in a relatively short time. √ | (2) |
|  | 1.5.6 | Reduce √, reuse √, recycle √ (Any 2) | (2) |
|  |  |  |  |
|  |  | **TOTAL SECTION A:** | **50** |

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|  |  |  |  |
| **SECTION B** | | |  |
|  | | |  |
| **QUESTION 2** | | |  |
|  |  |  |  |
| 2.1 | 2.1.1 |  | (8) |
|  |  |  |  |
|  |  | **Rubric for mark allocation of the bar graph**   |  |  | | --- | --- | | Title/caption | 1 mark | | X-axis (scale) | 1 mark | | Y-axis (scale) | 1 mark | | X-axis (labels) | 1 mark | | Y-axis (labels) | 1 marks | | Correct of type of graph | 1 mark | | Plotting bars |  | | 3-5 bars | 2 marks | | 1-2 bars | 1 mark | |  |

|  |  |  |  |
| --- | --- | --- | --- |
|  | 2.1.2 | 100 - 98% √ = 2 % √ | (2) |
|  |  |  |  |
|  | 2.1.3 | Methane √ | (1) |
|  |  |  |  |
|  | 2.1.4 | Because they can never be replenished √ and are being used at a high rate causing their supply to be exhausted √. | (2) |
|  |  |  |  |
|  | 2.1.5 | Fossil fuels are carbon-based organic compounds √ that release heat energy during combustion √. | (2) |
|  |  |  |  |
| 2.2 | 2.2.1 | Change in colour of methylene blue indicator for two water samples A and B that were taken at different places in the river.√ | (1) |
|  |  |  |  |
|  | 2.2.2 | Oxygen level is higher before the sewage outflow pipe√ and lower after the sewage outflow pipe.√  **OR**  Oxygen level is lower before the sewage outflow pipe√ and higher after the outflow pipe.√  **OR**  Oxygen levels are the same√ before and after the sewage outflow pipe.√  **OR**  Oxygen levels differ√ before the outflow pipe and after the outflow pipe.√ | (2) |
|  |  |  |  |
|  | 2.2.3 | B,√ To determine if sewage had any effect on oxygen level,√ one with sewage and one without sewage, the first one serves as a control.√ | (3) |
|  |  |  |  |
|  | 2.2.4 | * The loss of blue colour shows low levels of oxygen.√ * Because bacteria and other decomposers√ * Are abundant in the water because of the sewage√ * And therefore use up the oxygen.√ **(Mark first 3)** | (3) |
|  |  |  |  |
|  | 2.2.5 | * By collecting more samples of water before and after sewage outflow pipe√ and testing their oxygen levels.√ * By increasing the number of days√ for collection of water samples.√ * By repeating the investigation √ | (4) |
|  |  |  |  |
|  | 2.2.6 | Sewage is potentially harmful√ so protective gloves prevent sewage getting into the skin.√ | (2) |
|  |  |  | **[30]** |

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| **QUESTION 3** | | |  |
|  | | |  |
| 3.1 | 3.1.1 | C – glomerulus √/capillaries  D – Bowman’s capsule √ | (2) |
|  |  |  |  |
|  | 3.1.2 | Urea√, uric acid √, water √, glucose√, amino acids√, salts√, vitamins√, creatinine√, toxins√, hormones√, hippuric acid√ **(Mark first 3)** | (3) |
|  |  |  |  |
|  | 3.1.3 | Cuboidal √/epithelium | (1) |
|  |  |  |  |
|  | 3.1.4 | Podocytes √/squamous/epithelium | (1) |
|  |  |  |  |
|  | 3.1.5 | Part A has a larger/wider diameter√, while B has a smaller/narrower diameter √  **OR**  Part A has larger/wider diameter√ than B √and this increases the pressure in the glomerulus for better filtration.√ | (3) |
|  |  |  |  |
| 3.2 | 3.2.1 | Part 1 – surrounding epidermal cell√  Part 5 – pericycle√ | (2) |
|  |  |  |  |
|  | 3.2.2 | * Root hairs are elongated and finger-like.√ * Have thin cell walls with no cuticle.√ * Cells walls are porous and cell membrane is in direct contact with soil water.√ * Vacuole has high solute content and low water potential.√ | (3) |
|  |  |  |  |
|  | 3.2.3 | Root pressure√, transpiration pull√ and capillarity.√ | (3) |
|  |  |  |  |
|  | 3.2.4 | Endodermis regulates√ the flow of substances into the stele.√ | (2) |
|  |  |  |  |
| 3.3 | 3.3.1 | Synovial joint √ | (1) |
|  |  |  |  |
|  | 3.3.2 | A bone √ Femur  C ligament √  D synovial membrane √  F capsular ligament √ | (4) |
|  |  |  |  |
|  | 3.3.3 | Synovial fluid √ | (1) |
|  |  |  |  |
|  | 3.3.4 | Cartilage reduces friction between bones during movement.√ | (1) |
|  |  |  |  |
|  | 3.3.5 | Arthritis √ | (1) |
|  |  |  |  |
|  | 3.3.6 | When the amount of calcium in the body decreases, the body draws out calcium from the bones√ thus the bones become brittle and break easily (osteoporosis).√ | (2) |
|  |  |  | **[30]** |
|  |  |  |  |
|  |  | **TOTAL SECTION B:** | **60** |

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| **SECTION C** | | | |  |
|  | | | |  |
| **QUESTION 4** | | | |  |
|  |  |  | |  |
| 4.1 | 4.1.1 | | Blood from the vein is at a low pressure.√ It is pressured to keep it moving through the dialysis machine and back into the patient’s vein √ to improve filtration in the tubes, because the glomerulus is under pressure √ | (2) |
|  |  | |  |  |
|  | 4.1.2 | | Blood cells √ and plasma proteins. √ | (2) |
|  |  | |  |  |
|  | 4.1.3 | | So that there could be a difference in urea concentration between the blood and the dialysis fluid all the way through the machine.√ This means that more urea will diffuse out of the blood into the dialysis fluid.√ | (2) |
|  |  | |  |  |
|  | 4.1.4 | | Micro-organisms such as viruses and bacteria√ might move from the dialysis fluid into the blood and infect the patient.√ | (2) |
|  |  | |  |  |
| 4.2 | 4.2.1 | | O-group.√ This blood can be safely transfused into any other person.√/has neither A antigens nor B antigens on the membranes of the red blood cells.√ | (2) |
|  |  | |  |  |
|  | 4.2.2 | | Blood transfusion is the transfer of blood from one person (donor) to another (recipient).√ | (1) |
|  |  | |  |  |
|  | 4.2.3 | | Blood group AB.√ This group has no antibodies which could affect any blood that was transfused.√ | (2) |
|  |  | |  |  |
|  | 4.2.4 | | To make sure that it does not contain pathogens √ e.g. the HIV virus can easily be transmitted by blood transfusions.√  To find out its blood group√ e.g. incompatible blood groups cause agglutination.√ | (4) |
|  |  | |  |  |
| 4.3 | 4.3.1 | | 7 | (1) |
|  |  | |  |  |
|  | 4.3.2 | | 3 | (1) |
|  |  | |  |  |
|  | 4.3.3 | | The growth of plants decreases.√ | (1) |
|  |  | |  |  |
|  | 4.3.4 | | It is caused by the reaction of air pollutants with water in the air.√ | (1) |
|  |  | |  |  |
|  | 4.3.5 | | * By using coal that contains less sulphur.√ * Using ‘scrubbers’ to chemically remove sulphur dioxide gases that leave the smokestacks of factories and power plants.√ * Changing to natural gas, which contains less sulphur than coal.√ * Changing to energy sources other than fossil fuels.√ * Using catalytic converters in motor vehicles to reduce nitrogen oxide emissions.√ * Reducing overall energy use by using energy-efficient practices.√ **(Any 4)** | (4) |

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| 4.4 | **General diastole** √  The muscles of both the atria and the ventricles relax √ Blood flows into the atria from the vena cava √ and the pulmonary veins √. Blood flows into the ventricles √ past the open AV valves namely the bicuspid valve√ on the left and the tricuspid valve√ on the right. The semi-lunar valves are now  closed √ to prevent blood from the aorta and pulmonary arteries to flow back towards the ventricles√ | | (4) |
|  |  | |  |
|  | **Atrial systole** √  The two atria contract √ which forces blood past the open AV valves √ into the ventricles √. The ventricles are now relaxed √ | | (4) |
|  |  | |  |
|  | **Ventricular systole** √  As the atria relax √ the ventricles begin to contact √. Blood is pumped past the semi- lunar valves √ into the aorta √ and the pulmonary arteries √. The AV valves are now closed√ | | (4) |
|  | **Synthesis** | | (3) |
|  |  | | (15) |
|  | **ASSESSING THE PRESENTATION OF THE ESSAY**   |  |  | | --- | --- | | 3 | Well structured – demonstrates understanding of the question. | | 2 | Minor gaps in the answer. | | 1 | Attempted but with significant gaps in the answer. | | 0 | Not attempted/nothing written/nothing correct other than question number. |   **NB: No marks will be awarded for answers given in the form of flow charts or diagrams** | |  |
|  |  | |  |
|  |  | **TOTAL SECTION C:** | **40** |
|  |  |  |  |
|  |  | **GRAND TOTAL:** | **150** |