

Province of the

**EASTERN CAPE**

EDUCATION

**NATIONAL**

**SENIOR CERTIFICATE**

**GRADE 11**

**NOVEMBER 2010**

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| **PHYSICAL SCIENCES P2**  **MEMORANDUM** |

**MARKS: 150**

**TIME: 3 hours**

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| This memorandum consists of 7 pages. |

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| **SECTION A** | | | |  |
|  | | | |  |
| **QUESTION 1 ONE-WORD ITEMS** | | | |  |
| 1.1 | Dative covalent bond✓/Coordinate covalent bond 11.2.1 | | | (1) |
| 1.2 | Boyles Law 🗸 11.2.1 | | | (1) |
| 1.3 | Empirical formula 🗸 11.2.1 | | | (1) |
| 1.4 | Standard solution 🗸 11.2.1 | | | (1) |
| 1.5 | Oxidising agent 🗸 11.2.1 | | | (1) |
|  |  | | | **[5]** |
| **QUESTION 2: MULTIPLE-CHOICE QUESTIONS** | | | |  |
|  | |  | |  |
| 2.1 | | B🗸🗸 11.1.3 | | (2) |
| 2.2 | | A🗸🗸 11.2.2 | | (2) |
| 2.3 | | C🗸🗸 11.2.3 | | (2) |
| 2.4 | | D🗸🗸 11.1.2 | | (2) |
| 2.5 | | D🗸🗸 11.1.2 | | (2) |
| 2.6 | | C🗸🗸 11.2.2 | | (2) |
| 2.7 | | A🗸🗸 11.1.3 | | (2) |
| 2.8 | | B🗸🗸 11.2.1 | | (2) |
| 2.9 | | B🗸🗸 11.2.1 | | (2) |
| 2.10 | | C🗸🗸 11.3.3 | | (2) |
|  | |  |  | **[20]** |
|  | |  |  |  |
|  | |  | **TOTAL SECTION A:** | **25** |

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| **QUESTION 3** | | | | | | | |  | |
|  |  | | | |  | | |  | |
| 3.1 | 3.1.1 | | | | H O H ✓ ✓ 11.2.3 | | | (2) | |
|  |  | | | |  | | |  | |
|  | 3.1.2 | | | | O C O ✓ ✓ 11.2.3 | | | (2) | |
|  |  | | | |  | | |  | |
|  | 3.1.3 | | | | N N ✓ ✓ 11.2.3 | | | (2) | |
|  |  | | | | | | |  | |
| 3.2 | 3.2.1 | | | | Non-polar ✓ ✓ 11.2.3 | | | (2) | |
|  |  | | | |  | | |  | |
|  | 3.2.2 | | | | Polar ✓✓ | | | (2) | |
|  |  | | | |  | | |  | |
|  | 3.2.3 | | | | Polar ✓✓ | | | (2) | |
|  |  | | | | | | |  | |
| 3.3 | 3.3.1 | | | | Bond energy ✓ [11.2.1] | | | (1) | |
|  |  | | | |  | | |  | |
|  | 3.3.2 | | | | Energy absorbed to break bonds of reactants.  N Ξ N + 3 x H - H  941 kJ.mol-1 ✓ + 3 x 436 kJ.mol-1 ✓ = 2249 kJ.mol-1  Energy released when bonds formed.  6 x N – H  6 x 389 kJ.mol-1 ✓ = 2334 kJ.mol-1  ∆H = Energy absorbed to break bonds - Energy released when bonds form✓  = 2249 kJ.mol-1✓ - 2334 kJ.mol-1 ✓  = -85 kJ.mol-1✓ 11.1.3 | | | (7) | |
|  |  | | | |  | | |  | |
|  | | | |  | | | | |  |
| 3.4 | | | 3.4.1 | | | | A = + ∆H ✓  B = - ∆H ✓ 11.2.3 | (2) | |
|  | | |  | | | |  |  | |
|  | | | 3.4.2 | | | | Graph-2✓ ; energy of products is greater than energy of reactants✓✓, reaction is endothermic | (3) | |
|  | | | |  | | | | | **[25]** |

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| **QUESTION 4** | | | | | |  |
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| 4.1 | | | What is the relationship between temperature and pressure of an enclosed mass of gas? ✓✓ 11.1.2 | | | (2) |
|  | | |  | | |  |
| 4.2 | | | P α T ✓✓ 11.2.3 | | | (2) |
|  | | |  | | |  |
| 4.3 | | | Volume of the gas. ✓ 11.2.3 | | | (1) |
|  | | |  | | |  |
| 4.4 | | | Temperature is a measure of the average kinetic energy of the particles. ✓ When temperature increases the speed of the molecules increase which results in an increase in the number of effective collisions. ✓When the number of collisions increases the pressure increases. ✓ 11.2.3 | | | (3) |
|  | | |  | | |  |
| 4.5 | | | t °C = 447 – 273 = 174 °C 11.1.3 | | | (6) |
|  | | |  | | |  |
| 4.6 | | | ✓ **OR**  100 x 103 ✓ X 1 x 10-3 ✓ = n x 8,31 x 298  = 0,04 mole✓    MSO2 = 32 + (2 x16) = 64 g.mol-1  n = ✓  0,04 = ✓  m = 0,04 x 64  = 2,56 g ✓ 11.1.3 | | | (7) |
|  | | |  | | |  |
| 4.7 | | | -273 °C✓ ; Absolute zero✓ 11.2.3 | | | (2) |
|  | |  | | |  | **[23]** |

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| **QUESTION 5** | | | | | | |  |
|  | | | | | | |  |
| 5.1 | Determine the molecular formula of ethanoic acid. | | | | | |  |
| % mass (g) | | Atomic mass | Mole ratio n = m/M | Whole No. ratio |
| 39,9  6,7  53,4 | | 12  1  16 | 39,9/12 = 3,325✓  6,7/1 = 6,7✓  53,4/16 = 3,375✓ | 3,325/3,325 = 1  6,7/3,325 = 2✓  3,375/3,325 = 1✓ |
|  | Empirical formula =C H2 O✓  Empirical formula mass = 12 +2 +16= 30 g.mol-1  Relative molecular mass = 60 g.mol-1  n = = = 2✓  Molecular formula = n x empirical formula = 2 (C H2 O) = C2 H4 O2✓ 11.1.3 | | | | | | (8) |
|  |  | | | | | |  |
| 5.2 | 5.2.1 | n = ✓ = ✓= 0,03 mole ✓ 11.2.3 | | | | | (3) |
|  |  |  | | | | |  |
|  | 5.2.2 | Weak acid. ✓  Ethanoic acid ionises only partially in solution. ✓✓ 11.2.1 | | | | | (3) |
|  |  |  | | | | |  |
|  | 5.2.3 | 11.1.3 | | | | | (5) |
|  |  | | | | | | **[19]** |

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| **QUESTION 6** | | | | | | |  |
|  | | | | | | |  |
| 6.1 | | | A substance that loses electrons during a redox reaction. ✓✓ 11.2.1 | | | | (2) |
|  | | |  | | | |  |
| 6.2 | | | Zn → Zn2+ + 2e- ✓✓ 11.2.3 | | | | (2) |
|  | | |  | | | |  |
| 6.3 | | | Reduction ✓ 11.2.1 | | | | (1) |
|  | | |  | | | |  |
| 6.4 | | | Redox reaction ✓✓  ✓ ✓  Zn + Cu2+ → Zn2+ + Cu ✓(balancing) 11.2.3 | | | | (5) |
|  | | | ✓ ✓ | | | |  |
| 6.5 | | | Mg + 2 H+ → Mg2+ + H2 ✓(balancing) 11.2.3 | | | | (3) |
|  | | |  | | | |  |
| 6.6 | | | H+ ✓ 11.2.1 | | | | (1) |
|  | | |  | | | |  |
| 6.7 | | | +3✓ 11.2.1 | | | | (1) |
|  | | |  | | | | **[15]** |
| **QUESTION 7** | | | | | | |  |
|  | |  | | | | |  |
| 7.1 | | Saturated hydrocarbon. ✓  Contains only single (covalent) bond between two carbon atoms. ✓ 11.2.1 | | | | | (2) |
|  | | ✓ ✓ | | | | |  |
| 7.2 | | 2 C4H10 + 13 O2 → 8 CO2 + 5 H2O ✓(balancing) 11.2.3 | | | | | (3) |
|  | |  | | | | |  |
| 7.3 | | Organic compounds with the same molecular formula but with different structural formula. ✓✓ 11.2.1 | | | | | (2) |
|  | |  | | | | |  |
| 7.4 | | ✓✓  ✓✓ | | |  | |  |
|  | | But-2-ene✓ | | | But-1-ene✓ 11.2.3 | | (6) |
|  | |  | | | | |  |
| 7.5 | | 7.5.1 | | ✓  ✓  ✓ | | 11.2.3 | (3) |
|  | |  | |  | | |  |
|  | | 7.5.2 | | 1,2-dibromo propane ✓✓ 11.2.1 | | | (2) |
|  | |  | |  | | |  |
|  | | 7.5.3 | | Addition reaction ✓✓ 11.2.1 | | | (2) |
|  | |  | |  | | | **[20]** |
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| **QUESTION 8** | | | | | | |  |
|  | |  | |  | | |  |
| 8.1 | | The naturally occurring compound of a metal from which the metal can be extracted. ✓✓ 11.2.1 | | | | | (2) |
|  | |  | |  | | |  |
| 8.2 | | Carbon monoxide ✓ 11.2.1 | | | | | (1) |
|  | | ✓ ✓ | | | | |  |
| 8.3 | | Fe2O3 + 3 CO → 2 Fe + 3 CO2 ✓(balancing) 11.2.3 | | | | | (3) |
|  | |  | | | | |  |
| 8.4 | | To remove the impurity from the ore as slag. ✓✓ 11.2.1 | | | | | (2) |
|  | |  | | | | |  |
| 8.5 | | CaSiO3 ✓✓ 11.2.1 | | | | | (2) |
|  | |  | | | | |  |
| 8.6 | | For the construction of roads. ✓✓  To manufacture cement. ✓✓  For making building materials. (any two) 11.3.3 | | | | | (4) |
|  | |  | |  | | | **[14]** |
|  | |  | |  | | |  |
| **QUESTION 9** | | | | | | |  |
|  | |  | | | | |  |
| 9.1 | | Greenhouse gases like carbon dioxide produce greenhouse effect by trapping the Sun’s warmth in the lower atmosphere. ✓✓ An increase in the concentration of greenhouse gases results in an increase in the temperature on the Earth. ✓✓ 11.3.3 | | | | | (4) |
|  | |  | | | | |  |
| 9.2 | | Carbon dioxide✓, water vapour✓, methane gas✓, Nitrogen oxides.(Any three) 11.3.1 | | | | | (3) |
|  | |  | | | | |  |
| 9.3 | | Uses of fossil fuels for energy ✓  Burning coal to produce electricity ✓  Stock farming (Any two) 11.3.3 | | | | | (2) |
|  | |  | | | | | **[9]** |
|  |  | | |  | | |  |
|  |  | | | **TOTAL SECTION B:** | | | **125** |
|  |  | | |  | | |  |
|  |  | | | **GRAND TOTAL:** | | | **150** |