**Assessment schedule for Year 10 Science Topic Test ‘Structure of Matter’ 2014**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Question** | **Criteria** | | | | | **A** | **M** | **E** |
| **1a)** | Element  Compound  Mixture | | | | | 2 correct |  |  |
| **b)** | In a solid the particles are touching and are locked together (bonding) so they cannot move (can vibrate/rotate) and so cannot take the shape of the container. In a liquid the particles touch but are free to move so they can take the shape of the container. In a gas the particles are not touching and are free to move and take up the whole container. | | | | | Correct diagram | Correct description of spacing, arrangement and movement of (s),(l),(g).  Or  Diagram and movement (s),(l),(g). | Merit  +  link of shape to container for (s),(l),(g). |
| **2a)** | 1. neutron 2. proton 3. electron | | | | | electron correct  proton & neutron in nucleus | All correct |  |
| **b)** | 1. 0 2. + 3. – | | | | | neutron, 0  proton, +  consistent with 2a) |  |  |
| **c)** | |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **Symbol** | **Atomic**  **number** | **Mass**  **number** | **Number**  **of protons** | **Number of electrons** | **Number of neutrons** | | Al | 13 | 27 | 13 | **13** | **14** | | C | **6** | 12 | **6** | 6 | 6 | | Na | 11 | 23 | 11 | **11** | 12 | | O | 8 | 16 | **8** | 8 | 8 | | | | | | 4 correct | all correct |  |
| **3a)** | by losing or gaining electrons so that it has a full outer shell | | | | | loss or gain of e | A + full valence shell |  |
|  | |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **Sym** | **Name** | **# e** | **E con** | **Lose/gain** | **# l/g** | **Ion** | | Na | **sodium** | 11 | **2,8,1** | **lose** | **1** | **Na+** | | **N** | nitrogen | **7** | 2,5 | gain | **3** | **N3-** | | Al | **Aluminium** | **13** | 2,8,3 | **lose** | **3** | **Al3+** | | **S** | sulfur | 16 | **2,8,6** | **gain** | **2** | **S2-** | | | | | | Columns 1,2 and 3 | A + 5 and 6 | **M+4 and 7** |
| **c)** | Li, Na, K atoms   * All have 1 valence (outer shell) electron * They are all in group 1 on the periodic table * They all lose 1 electron to form an ion * All have lost 1 electron and therefore have a +1 charge (Na+, Li+, K+ ions) * so they all react in the same way with other substances. | | | | | 2 correct point | 3 correct points | 4 correct points,  must have last point |
| **d)** | He, Ne, Ar all   * Have full outer/valence shells * so they are already stable * and do not react with any other atoms (are inert) | | | | | 1st point | 2 points correct.  must have 1st point. |  |
| **e)** | i) sodium chloride  ii) potassium hydroxide  iii) hydrogen sulfide  iv) copper sulfate  v) silver nitrate | | | | | 3 correct | 5 correct |  |
| **f)** | e.g. | Name (given) | +ve ion | -ve ion | Formula | 9/15 | 12/15 | 15/15 |
| (i) |  | Mg2+ | O2- | MgO |
| (ii) |  | Al3+ | Cl- | AlCl3 |
| (iii) |  | Na+ |  | NaHCO3 |
| (iv) |  | Ca2+ |  | CaCO3 |
| (v) |  | Li+ | O2- | Li2O |
| **4a)** | P C  C C  C P  P P | | | | | 6 correct |  |  |
| **b)** | Chem   * new substance formed(join together / break apart), (colour change, gas given off, reactant disappears, energy in/out) * very hard to undo * atoms break apart and join together in a different order.   Phys   * No new substance (change shape, state, dissolving) * relativity easy to undo * particles (not atoms) may break apart but jion back together in the same way (No new bonds form) | | | | | 1 point from each of chem and phys | 4 points | 5+  gives example(s) |
| **5a)** | copper carbonate 🡪 carbon dioxide + copper oxide | | | | | Correct word equation |  |  |
| **b)** | zinc + hydrochloric acid 🡪 zinc chloride + hydrogen  Zn + 2HCl 🡪 ZnCl2 + H2 | | | | | Correct word equation | symbol equation  allow H (for H2) | Correct balanced equation |
| **c)** | methane + oxygen 🡪 carbon dioxide + water | | | | | Correct word equation |  |  |

Only the highest grade for each question is awarded.

total questions =16

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| --- | --- | --- | --- |
| **Opportunities:** | **Achievement 16** | **Merit 11** | **Excellence 6** |
| **Sufficiency:** | **9** | **6M + 5A** | **4E + 3M + 4A** |