**Chemistry and Acids- Multiple Choice Section**

**(8 marks)**

|  |  |
| --- | --- |
| **Question Number** | **Answer** |
| 1 | D |
| 2 | B |
| 3 | A |
| 4 | C |
| 5 | C |
| 6 | B |
| 7 | D |
| 8 | B |

**Chemistry and Acids- Short Answer Section**

**(50 marks)**

**Question 1 (6 marks)**

a) Any of the following for 1 mark each

- pH greater than 7

- releases OH- ions when dissolved in water

- turns red litmus blue

- turns universal indicator blue/indigo/violet/purple

- bitter taste

-slippery texture

b) Complete the table to identify the name, chemical formula, classification and strength of the following acids and bases (3)

9-10 correct= 3 marks

5-8 correct= 2 marks

2-4 correct= 1 mark

1 or less correct= 0 marks

|  |  |  |  |
| --- | --- | --- | --- |
| Name of Chemical | Chemical Formula | Acid or Base? | Strong or Weak? |
| Acetic Acid | CH3COOH | Acid | Weak |
| Sodium Hydroxide | NaOH | Base | Strong |
| Sulfuric Acid | H2SO4 | Acid | Strong |
| Calcium Hydroxide | CaOH2 | Base | Strong |

c) Identify the difference between a weak acid and a strong acid in terms of what happens to them when they are dissolved in water (1)

- Strong acid releasing more H+ ions OR weak acid releasing less H+ ions

**Question 2 (5 marks)**

a)

|  |  |
| --- | --- |
| **Guidelines** | **Marks** |
| Atom containing 19 protons  Atom containing 19 electrons  Overall no charge  Ion containing 19 protons  Ion containing 18 electrons  Overall +1 charge | 4 |
| One of the above missing or incorrect | 3 |
| Three of the above missing or incorrect | 2 |
| Some relevant correct information | 1 |

**Sample Answer- An atom of potassium will contain 19 protons and 19 electrons, giving it a neutral charge. An ion of potassium has lost one of its outer shell electrons, leaving it with 19 protons and only 18 electrons. This gives it an overall charge of +1.**

**Many students here DID NOT refer specifically to POTASSIUM. Ensure question is read in future and specific answers are used by students. Full marks were awarded if correct reference to potassium LOSING an electron (many students said potassium could lose OR GAIN an electron)**

b) An atom that has gained electron/s; atom that has a negative charge (1)

**Question 3 (15 marks)**

a) Acid + Metal → Salt + Hydrogen

|  |  |
| --- | --- |
| **Guidelines** | **Marks** |
| Reactants both correct and products both correct | 2 |
| Reactants both correct OR products both correct OR one reactant and one product correct | 1 |

Some students wrote a SPECIFIC example. They were awarded ONE MARK ONLY.

b) 1 mark each

i) Aluminium Chloride

ii) Potassium Sulfate

iii) Calcium Nitrate

c) i)

|  |  |
| --- | --- |
| **Guidelines** | **Marks** |
| Hydrogen/ atoms come from sulfuric acid | 2 |
| Hydrogen/ atoms come from the acid | 1 |

ii) Potassium + Sulfuric Acid → Potassium Sulfate + Hydrogen

ECF was allowed here if they incorrectly identified the salt in part b, and used the same salt in this answer. No ecf was allowed for water as the second product.

|  |  |
| --- | --- |
| **Guidelines** | **Marks** |
| Reactants both correct and products both correct | 2 |
| Reactants both correct OR products both correct OR one reactant and one product correct | 1 |

iii) H2SO4 + 2K → K2SO4 + H2

|  |  |
| --- | --- |
| **Guidelines** | **Marks** |
| -Both products correct  -Both reactants correct  -Coefficient 2 in front of K | 3 |
| Any 2 of the above | 2 |
| Some aspect of the equation correct | 1 |

There are Three ticks/crosses. One for correct reactants, one for correct products, and one below these two for balanced equation. Students could still get balanced mark even if they incorrectly identified reactants and products.

d) i) Both will bubble/ produce hydrogen/ produce heat

Many students said “there will be a reaction” but did not identify a specific OBSERVATION that would indicate a chemical reaction.

ii)

|  |  |
| --- | --- |
| **Guidelines** | **Marks** |
| - Identifies that Ca will produce more bubbles/H2/heat  - Link to Ca being more reactive that Al | 2 |
| Reference to one of the above or some relevant information | 1 |

Students MUST have referred to reactivity series for full marks (as indicated by the capitalised instruction) but were awarded ONE MARK if they identified a different salt would form.

Many students need guidance on EXPLAIN verb

**Question 4 (10 marks)**

a)

|  |  |
| --- | --- |
| **Guidelines** | **Marks** |
| - Reference to charge  - Reference to containing more than one atom | 2 |
| Reference to one of the above or some relevant information | 1 |

**Sample Answer- A polyatomic ion is made of two or more atoms (that are covalently bonded) and has a positive or negative charge that is applied to the entire molecule.**

b) (1 mark for each correct)

i) H+ + Cl- --> HCl

ii) Mg2+ + F- --> MgF2

iii) Al3+ + CO32- --> Al2(CO3)3

c) For each equation, 1 mark for product correct, 1 mark for reactants correct

(if entire equation uses correct elements/compounds, but no valency, award one mark)

i) Be2+ + OH- → Be(OH)2

ii) Ca2+ + PO43- → Ca3(PO4)2

**Question 5 (8 marks)**

**Word Equations**

|  |  |
| --- | --- |
| **Guidelines** | **Marks** |
| - Reactants all correct  - Products all correct | 2 |
| All reactants correct OR  All products correct OR  One reactant AND one product correct | 1 |

**Chemical Equations**

|  |  |
| --- | --- |
| **Guidelines** | **Marks** |
| - Reactants all correct  - Products all correct  - Equation balanced | 2 |
| - Reactants all correct  - Products all correct | 1 |

a) i) Hydrochloric Acid + Sodium Carbonate →

Sodium Chloride + Water + Carbon Dioxide

ii) 2HCl + Na2CO3 → 2NaCl + H2O + CO2

b)

i) Potassium Hydroxide + Nitric Acid →

Potassium Nitrate + Water

ii) KOH + HNO3 → KNO3 + H2O

**Question 6 (6 marks)**

a) 1 mark for each in correct range (NB: Word art shapes to indicate ranges below are not in perfect positions!)

b) 1 mark for each correct description circled

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Substance** | **Description of Substance** | | | | | |
| **A** | Strong Base | Weak Base | Neutral | Weak Acid | **Strong Acid** | Not enough information |
| **B** | Strong Base | Weak Base | Neutral | **Weak Acid** | Strong Acid | Not enough information |
| **C** | Strong Base | Weak Base | Neutral | Weak Acid | Strong Acid | **Not enough information** |