**Joseph Banks Secondary College**

Year 12 Integrated Science: General

****Unit 4 - Task 9

**Assessment type:** Test – Chemical reactions, mixtures and solutions.

**Time allowed for this paper**

Reading time: 5 minutes

Working time for paper: 50 minutes

**Materials required/recommended for this paper**

***To be provided by the supervisor***

This Question/Answer Booklet

Chemistry data booklet

Periodic Table

***To be provided by the candidate***

Standard items: pens, pencils (including coloured), sharpener, correction fluid, eraser, ruler, highlighters.

**Task Weighting:**

7.5% of the school mark for this pair of units

**NAME:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Structure of this paper**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Section** | **Number of questions** | **Marks available** |
| **A** | Multiple choice | 20 | /20 |
| **B** | Short answer | 6 | /37 |
|  | **Total** |  | **/57** |

**Section A Multiple choice (20 marks)**

Section A consists of 20 questions, each worth one mark. Each question has only one correct answer. Circle the appropriate box to record your answer. You are advised to spend no more than 20 minutes on this section.

1. Which of the following is an example of a physical change?
2. A gas being produced when a metal is added to an acid
3. Salt crystals dissolving in water
4. A solid forming when two solutions are added together
5. A temperature increase when a metal is added to water
6. Ionic compounds form through the combination of:
7. A non-metal and a non-metal
8. Sharing electrons between two different atoms
9. Cations and anions balancing each other
10. A metal and a metal
11. The valency of an atom refers to its:
12. Number of outer shell electrons
13. The number of atoms in the compound
14. The number of protons in the nucleus
15. The period the atoms occurs in.
16. During an acid-metal reaction, the products formed from this reaction are:
17. Carbon Dioxide and Water
18. Metal Salt and Carbon Dioxide
19. Metal Salt and Hydrogen Gas
20. Carbon Dioxide and Hydrogen Gas
21. What is the overall charge of an ionic compound?
22. Negative
23. Positive
24. Neutral
25. Cannot be determined without knowing which ion it is
26. Which of the following statements about covalent bonding is false?
27. Covalent bonding occurs when pairs of electrons are shared between atoms
28. Covalent bonding is always between two non-metals
29. Covalent bonds are weaker than ionic bonds
30. Single, double and triple bonds are types of covalent bonds
31. Which two atoms form a cation with the same charge?
32. Magnesium atom and Lithium atom
33. Magnesium atom and Sodium atom
34. Magnesium atom and Strontium atom
35. Aluminium atom and Copper (II) atom
36. What is the valency of iron in FeCl3?
37. 1
38. 2
39. 3
40. 4
41. Which of the following polyatomic ions has a charge of –2?
42. Ammonium
43. Carbonate
44. Hydroxide
45. Phosphate
46. Which of the following have the same number of valence electrons?
47. A neon atom and a sodium ion
48. An oxygen atom and a magnesium atom
49. A potassium ion and a chlorine atom
50. An oxygen atom and a nitrogen atom
51. Which of the following is not a common property of metals?
52. Malleable
53. Dull
54. Ductile
55. Good conductor of heat
56. Which of the following are products of a complete combustion reaction?
57. Carbon Dioxide and Carbon Monoxide
58. Carbon Dioxide and Water
59. Water and Carbon Monoxide
60. Oxygen and Carbon Dioxide
61. Anions are formed when:
62. non-metal atoms share electrons.
63. metal atoms share electrons.
64. metal atoms lose one or more electrons.
65. non-metal atoms gain one or more electrons.
66. Which of the following is the balanced chemical reaction for the combustion of Butane?
67. 2C4H10. + 13O2. 🡪 8CO2 + 10H2O
68. 3C4H10. + 11O2. 🡪 12CO2 + 9H2O
69. C4H10. + O2. 🡪 CO2 + H2O
70. 2C4H10. + 12O2. 🡪 7CO2 + 10H2O
71. Which type of compound is Potassium Bromide?
72. Metal
73. Ionic
74. Covalent molecular
75. Covalent network
76. What is the correct formula for Octane?
77. CH4
78. C18H24
79. NH4H
80. C8H18
81. What is the name of the compound N2O3?
82. Nitrogen trioxide
83. Nitrogen oxide
84. Nitric oxide
85. Dinitrogen trioxide
86. Which is NOT a sign of a chemical change?
87. Gas production
88. Heat production
89. Dissolving
90. Colour change
91. A solute is:
92. Dissolved in the solvent
93. Used to dissolve a solvent
94. The major component of a mixture
95. Always heterogenous
96. An example of a composite material is:
97. A gold ring
98. Kevlar
99. Sodium Chloride
100. Steel

**Section B Short answer (30 marks)**

Section B consists of six questions. Write your answers in the spaces provided. You are advised to spend 30 minutes on this section.

* 1. Define the terms heterogeneous and homogeneous mixtures. Provide an example of each. **(4 marks)**

Heterogeneous mixtures are non-uniform (physically separate materials) e.g soil, concrete, milk (1 mark)

Homogenous mixtures have a uniform composition throughout e.g. salt water, air (1 mark)

2.5 g of a white powder was in a crucible. It was heated with a Bunsen burner until a liquid was formed. After cooling a piece of white solid remained. It weighed 2.0 g. Explain whether this is a physical or chemical change. Give a reason for your answer. **(2 marks)**

Physical/chemical change (1 mark)

Justification of answer (1 mark).

1. Ammonia could also be named mononitrogen trihydride. Write the chemical formula for ammonia. **(1 mark)**

NH3

1. Write the chemical formula for the following substances. **(5 marks)**
2. Iron(III) Nitrate

Fe(NO3)3 (1 mark)

1. Lithium Sulfate

Li2SO4 (1 mark)

1. Aluminium Chloride

AlCl3 (1 mark)

1. Hydrogen Bromide

HBr (1 mark)

1. Boron Trichloride

BCl3 (1 mark)

1. Write the chemical name for the following formulas: **(5 marks)**
2. SeF6

Selenium Hexafluride (1 mark)

1. Si2Br6

Disilicon Hexabromide (1 mark)

1. SCl4

Sulphur Tetrachloride (1 mark)

1. B2Si

Diboron Silicide (1 mark)

1. NF3

Nitrogen Trifluride (1 mark)

1. **Provide the missing name, ions or formula for the following ionic compounds (10 marks)**

**5 for the cations and anions (both need to be correct for the mark)**

**7 for the name/formula (1 mark per correct answer)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Cation** | **Anion** | **Formula** |
| Barium Hydroxide | Ba+2 | OH- | Ba(OH)2 |
| Potassium Carbonate | K+1 | CO3-2 | K2CO3 |
| Calcium Nitrate | Ca+2 | NO3- | Ca(NO3)2 |
| Lithium Phosphate | Li- | PO4-3 | Li3PO4 |
| Potassium Carbonate | K+1 | CO3-2 | K2CO3 |
| Aluminium Acetate | Al+3 | C2H3O2- | Al(C2H3O2)3 |

* 1. Name a composite material. **(5 marks)**

Lists an appropriate composite material (1 Mark)

* 1. For the composite material you named in 26a, name/describe a product or use of this composite material.

Names/describes a reasonable use of the listed composite material (1 mark)

* 1. List three properties this material has which make it suitable for the product you have described.

Lists three reasons why the material is suitable for the product listed above (3 marks)

1. For the chemical reactions below, supply the missing compounds. **(5 marks)**
   1. Aluminium +  Sulphuric Acid ===> Aluminium Sulfate + Hydrogen
   2. Zinc + Hydrochloric Acid ===>  Zinc Chloride + Hydrogen
   3. Mg + HCL ===> MgCl2 + H2
   4. ZnO + H2SO4 ===> ZnSO4 + H2O
   5. Mg + H2SO4 ===>  Mg(SO4)2 +  H2