| 2. The starting materials in chemical reactions are called _reactants 3. The electron is a substance that has a _negative_charge. 4. An ion that contains more than one atom is called a _polyatomic_ ion. 5. The number written in front of a chemical compound is called a _coefficient 6. The burning of a substance is called _combustion 7. A reaction between elements is a _synthesis_reaction. 8. The speed at which a reaction occurs is the _rate_ of reaction. 9. A reaction that absorbs heat is called _endothermic 10. Water, gas, or solid products are clues that a double _displacement_ reaction has occurred. 11. A(n) _acid_ is a substance that when dissolved in water ionizes to form H* ions and anions. 12. The _pH_ scale is used to determine the degree of acidity or alkalinity. 13. Increasing the _concentration_ of a solution will increase the amount of collisions. 14. When an ionic substance is dissolved in water it undergoes the process of _ionization 15. A(n) _base is a substance that when dissolved in water ionizes to form cations and OH* ions. 16. An aqueous solution that is capable of conducting electricity is known as a(n) _electrolyte 17. A substance that speeds up chemical reactions is called a _catalyst 18. Water and salt are the products of a _neutralization_ reaction. 19. A(n) _indicator_ is a substance that changes colour at a specific pH range. 20. Blue _litmus_paper turns red in an acid. 8. True or False (If the statement is false, REWRITE the statement to make it true) 21. Compounds that contain carbon and hydrogen are called ionic compounds. 22. Covalent 23. Another term for bonding capacity is exidation number. 24. An alkaline earth metal element forms an ion with a 4- ionic charge. 25. A skeleton equation describes only the number of the reactants and products. 26. The Law of Conservation of Mass states that the numbers of atoms of reactants and products must be T 27. The reaction of barium nitrate and sodium sulphide would be a double displacement reaction. 27. The reaction | |
|--|-----------|
| acid base catalyst chemical coefficient combustion concentration displacement electrolyte endothermic indicator ionization litmus negative neutralization pH polyatomic rate reactants synthesis 1. A _chemical_ property is one that involves the production of a new substance. 2. The starting materials in chemical reactions are called _reactants 3. The electron is a subatomic particle that has a _negative_ charge, 4. An ion that contains more than one atom is called a _polyatomic_ ion. 5. The number written in front of a chemical compound is called a _coefficient 6. The burning of a substance is called _combustion 7. A reaction between elements is a _synthesis_ reaction. 8. A reaction basorbs heat is called _endothermic 9. A reaction that absorbs heat is called _endothermic 10. Water, gas, or solid products are clues that a double _displacement_ reaction has occurred. 11. A(n) _acid_ is a substance that when dissolved in water ionizes to form H' ions and anions. 12. The _pH scale is used to determine the degree of acidity or alkalinity. 13. Increasing the _concentration_ of a solution will increase the amount of collisions. 14. When an ionic substance is dissolved in water it undergoes the process of _ionization 15. A(n) _base is a substance that when dissolved in water ionizes to form cations and OH ions. 16. An aqueous solution that is capable of conducting electricity is known as a(n) _electrolyte 17. A substance that speeds up chemical reactions is called a _catalyst 18. Water and salt are the products of aneutralization_ reaction. 19. A(n) _indicator_ is a substance that changes colour at a specific pH range. 20. Blue _litmus_ paper turns red in an acid. 8. True or False (If the statement is false, REWRITE the statement to make it true) 21. Compounds that contain carbon and hydrogen are called ienic compounds. 6. Formic compound chemical formulas show a lowest terms ratio of elements. Formic compound chemical formulas show a lowest terms ratio of elements. | |
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| 31. Each 1 unit on the pH scale represents a tenfold increase in concentration. | |
| т | |
| 32. Decreasing the surface area of a reactant would increase the rate of reaction.F decrease | |
| 33. Increasing the concentration of the reactants would increase the rate of reaction. $oldsymbol{T}$ | |
| 34. Decreasing the temperature of the reaction would increase the rate of reaction. F decrease | |
| 35. Phenolphthalein turns pink in an acid . F base | |

| C. Similarities/Differences (describe similarities | /differences between each pair) | |
|--|--|------------------|
| 36. physical property, chemical property | 40. proton, neutron | |
| - phys: characteristic of matter that can | - <u>proton</u> : positive subatomic particle | : located |
| be observed or measured without a change | in the nucleus, p ⁺ | اممعمما |
| in chemical identitychem: characteristic of a substance observ | neutron: neutral subatomic particle in the nucleus, n° | е посатеа |
| when it participates in a chemical reaction | in the nucleus, n | |
| | | |
| 37. atom, ion | 41. ionic compound, covalent compound | |
| atom: smallest component of an element the retains the properties of an element. | ionic compound: formed between a non-metal caused by an attraction be | |
| - <u>ion</u> : an atom or molecule with a charge due | • | |
| a gain or loss of electrons | - covalent compound: formed between | |
| a ga o. 1000 o, 010011 one | metals as a result of sharing electron | |
| 38. acid, base | 42. metal oxides/non-metal oxides | |
| - acid: an aqueous substance that when dissolv | | nixed with water |
| in water dissociates into $H^{+}_{(aq)}$ and an anion. | - non-metal oxide: forms an oxyaci | |
| - base: an aqueous substance that when dissol | d water | |
| in water dissociates into OH-(aq) and a cation | | |
| 39. cation, anion | 43. endothermic, exothermic | |
| - cation: an ion with a positive charge as a res | t of - <u>endothermic</u> : an energy reaction wh | ere energy is |
| Losing a(n) electron(s), usually a metal. | absorbed and the system feels cool. | |
| - <u>anion</u> : an ion with a negative charge as a res | | - - |
| gaining a(n) electron, usually a non-metal | released and the system feels warm | 1. |
| D. Multiple choice (Choose the best ans | er) | |
| 44. What type of reaction occurs between magnes | m and hydrogen chloride? | |
| a) synthesis |) single displacement | |
| b) decomposition | l) double displacement | |
| 45. What type of reaction occurs between sodium | nd chlorine? | |
| a) synthesis |) single displacement | |
| b) decomposition | l) double displacement | |
| 46. What type of reaction occurs between magnes | | |
| a) synthesis |) single displacement | |
| b) decomposition | l) double displacement | |
| 47. Cake batter rises when the cake is baked. Thi | | |
| a) concentration |) temperature | |
| b) surface area | l) a catalyst | |
| 48. The sum of the coefficients from the following | balanced equation is | |
| $4K_{(s)} + O_{2(g)} \to 2K_2O_{(s)}$ a) 11 |) 7 | |
| b) 6 | 1) 8 | |
| 49. Which of the following would make an acid wh | dissolved in water? | |
| a) sulphur trioxide | aluminum oxide | |
| b) magnesium oxide | l) copper(I) oxide | |
| 50. Which of the following would make a base whe | dissolved in water? | |
| a) carbon dioxide |) sodium oxide | |
| b) sulphur trioxide | l) nitrogen dioxide | |
| 51. What type of reaction occurs between NaOH | HCI? | |
| a) synthesis |) single displacement | |
| b) decomposition | l) double displacement | |
| 52. The pH of the reaction in # 51 should be | _ | |
| a) 0 |) 7 | |
| b) 5 | l) 9 | |
| 53. A substance that conducts electricity and fee | • | _ |
| a) turn blue litmus paper red b) turn bromothymol yellow | r) produce <i>CO_{2(q)} w</i> hen reacted with baking sodo I) turn phenolphthalein pink | 1 |
| by rain bromornymor yenow | , .a. ii pilonoipitinaioin pilik | |

54. Give 5 characteristic properties of both acids and bases.

| PROPERTY | ACID | BASE | |
|------------------|------------------------|-------------|--|
| рН | 0-7 | 7-14 | |
| taste | sour | bitter | |
| feel | No characteristic feel | slippery | |
| Conductivity | yes | yes | |
| Litmus | Blue to red | Red to blue | |
| Bromothymol Blue | Blue to yellow | Stays blue | |
| Phenolphthalein | clear | pink | |
| Carbonates | CO₂ gas produced | No reaction | |

E. Naming (fill in the following chart)

| N. | Farmula | |
|------------------------|------------------------------------|--|
| Name | Formula | |
| SODIUM BROMIDE | NaBr | |
| lithium phosphate | Li ₃ PO ₄ | |
| MAGNESIUM IODIDE | MgI ₂ | |
| calcium carbonate | CaCO ₃ | |
| CALCIUM NITRATE | Ca(NO ₃) ₂ | |
| silver iodide | AgI | |
| IRON(III)CHLORIDE | FeCl ₃ | |
| aluminum bromide | AlBr ₃ | |
| POTASSIUM SULPHATE | K ₂ 5O ₄ | |
| phosphorus trichloride | PCI ₃ | |
| CARBON TETRABROMIDE | CBr ₄ | |
| dinitrogen pentoxide | N ₂ O ₅ | |
| TIN(IV)SULPHIDE | SnS ₂ | |
| lead(II)oxide | РЬО | |
| HYDROCHLORIC ACID | HCl _(aq) | |
| nitric acid | HNO _{3(aq)} | |
| PHOSPHORIC ACID | H ₃ PO _{4(aq)} | |
| magnesium hydroxide | Mg(OH) _{2(aq)} | |

55. Define rate of reaction. Explain how each of the following factors affects the overall rate of a chemical reaction:

Rate: the speed of the reaction

a) concentration

- the amount of molecules in a given space. \uparrow concentration results in \uparrow collisions and a faster Rate

b) catalysts

- speed up rate of activation energy. Not used up in a reaction.

c) temperature - average speed of reaction by reducing molecules in a system.

 \uparrow temp. \uparrow effective collisions = \(\tau \) rate.

d) surface area -amount of exposed molecules. \uparrow SA = ↑ rate

F. Balancing (balance the following equations and identify the type of reaction)

56. _ Br_{2(g)} + **_2** $KI_{(\alpha q)} \rightarrow$ **_2** $KBr_{(\alpha q)} +$ _ $I_{2(g)}$

Type: __single displacement____

57. $_{2(s)} + _{N_{2(g)}} \rightarrow _{Sr_3}N_{2(s)}$

Type: __synthesis____

Type: __synthesis___

58. ____ $K_2O_{(s)} +$ ____ $H_2O_{(l)} \rightarrow$ _2 $KOH_{(aq)}$

Type: __synthesis____

59. ___ $SO_{3(g)}$ + ___ $H_2O_{(I)}$ \rightarrow ___ $H_2SO_{4(\alpha q)}$

Type: __double displacement / neutralization__

61. $zinc + iron(III)nitrate \rightarrow iron + zinc nitrate$

Type: __single displacement____

 $_3$ Zn + $_2$ Fe(NO₃)₃ \rightarrow $_2$ Fe + $_3$ Zn(NO₃)₂

62. magnesium carbonate → magnesium oxide + carbon dioxide

Type: ___decomposition__

 $_$ MgCO₃ \rightarrow $_$ MgO + CO₂

63. silver nitrate + calcium iodide \rightarrow silver iodide + calcium nitrate

60. _2_ Al(OH)_{3(aq)} + _3_ H₂SO_{4(aq)} \rightarrow ____ Al₂(SO₄)_{3(aq)} + _6_ H₂O_(I)

Type: ____double displacement_____

 $_2$ AgNO₃ + $_2$ CaI₂ \rightarrow $_2$ AgI + Ca(NO₃)₂

64. potassium + oxygen → potassium oxide

Type: ____synthesis____

 $_4$ K + $_2$ O₂ \rightarrow $_2$ K₂O

65. hydrochloric acid + barium hydroxide → water + barium chloride

 $_2$ HCl + $_2$ Ba(OH)₂ \rightarrow $_2$ H₂O + $_2$ BaCl₂

Type: ___ double displacement / neutralization

G. Bonding (Using electron dot diagrams, show how the following molecules are formed) 66.

| Bonding Atoms | EDD | EDD | Formation of Bond (Movement of Electrons) | Ions formed |
|------------------------|-----|-----|---|---|
| Lithium and sulphur | Li* | :5: | Li• Li• | 2 [Li] ⁺¹ [:§;] ² |

67.

| Bonding Atoms | EDD | EDD | Formation of Bond (Movement of Electrons) | Ions formed |
|---------------------|------|-----|---|---|
| Aluminum and oxygen | ·Ÿl· | .ö: | Al Ö: | 2[AI] ⁺³ [:0:] ²⁻ |

68.

| Covalent Molecule | Atom EDD | Atom EDD | Compound EDD | Structural Diagram |
|-------------------|----------|----------|--------------|--------------------|
| OBr₂ | .ö: | :Br: | Br: O: Br: | Br - O - Br: |

69.

| Covalent Molecule | Atom EDD | Atom EDD | Compound EDD | Structural Diagram |
|-------------------|----------|----------|--------------|--------------------|
| CO ₂ | ٠Ċ٠ | ٠ö: | ö: | ;o=c=o; |

H. Diagrams (Draw Bohr-Rutherford Diagrams for the following)

70. Calcium, Ca 71. Aluminum

