**10 SCIENCE 2014**

**CHEMISTRY TEST TWO**

**Name:** _____ **Teacher:** _____ **Mark:** /50

TEACHER COPY **Percentage:** %

**SECTION A:** **MULTIPLE CHOICE** **(10 marks)**

Please answer on the answer grid below.


**1.** Select the incorrect statement about catalysts.

(a) Catalysts increase the amount of energy needed to convert reactants into products.
(b) Catalysts make it easier for reactant molecules to collide and form products.
(c) Catalysts speed up chemical reactions.
(d) Catalysts are not used up during reactions.

**2.** Choose the missing words for this statement.

If a solid reactant is divided into smaller pieces, more of the solid is exposed to the liquid reactant and the rate of reaction is increased.

(a) Reactant, increased.
(b) Product, increased.
(c) Product, decreased.
(d) Product, increased.

**3.** Choose the correct definition for 'ions'.

(a) Particles that have the same number of protons and electrons.
(b) Particles that have no charge.
(c) Particles that have more neutrons than protons.
(d) Particles that have a charge.

**4.** A cation is an atom that has a:

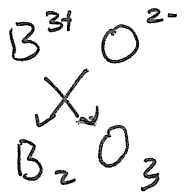
(a) Negative charge.
(b) Positive charge.
(c) No charge.
(d) Neutral charge.

**5.** $AgNO_3$ has the compound name:

(a) Argon nitrite.
(b) Silver nitrate.
(c) Silver nitrite.
(d) Argon nitrate.

**6.** The chemical formula for boron oxide is:

(a) BO
(b) $B_2O_3$
(c) BaO
(d) $B_3O_2$




**7.** An aqueous solution is:

(a) a solution of a substance dissolved in an acid.
(b) a solution of a substance dissolved in water.
(c) a solution of aqua.
(d) a solution of two different chemicals.

**8.** The general name for the chemicals that take part in a chemical reaction is:

(a) reactants.
(b) molecules.
(c) products.
(d) retractants.

**9.** "Matter cannot be created or destroyed during a chemical reaction" is known as:

(a) the law of conversation of mass.
(b) the law of creation of mass.
(c) the law of conservation of mass
(d) the law of conservation of matter.

**10.** Choose the equation that is not balanced.

(a) $C_5H_{12} + 8O_2 \rightarrow CO_2 + 6H_2O$
(b) $Mg + 2HCL \rightarrow MgCl_2 + H_2$
(c) $4Al + 3O2 \rightarrow 2Al_2O_3$
(d) $2Zn + O_2 \rightarrow 2ZnO$

**SECTION B:** thing **SHORT ANSWER** **(40 marks)**

**1.** List three ways that affect the rate of chemical reactions. (3 marks)

Any 3 1 mark each

Temperature

Concentration of reactants

Surface area

Agitation (stirring) Catalyst

**2.** Explain how agitation increases the rate of reaction of a chemical reaction. (2 marks)

Agitation makes sure the reactants are kept in (1) contact and removes the build-up of products around the reactants. (1)

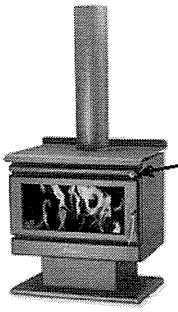
**3.** Explain the effect of the following changes on a wood fire heater. (4 marks)

**a.** The wood is chopped into smaller pieces.

The fire will burn (1) faster and produce more heat because you have increased (1) the surface area of the wood.

**b.** The vent is closed so that less air can get in.

The fire will burn slower (1) and produce less heat because you have reduced the concentration (1) of oxygen which is also part of the chemical reaction.



Vent: can be slid open and closed to allow in air.

**4.** State what the arrow (→) means in chemical equations. (1 mark)

'Combine to give' or 'rearrange to make'.

**5.** Balance the equations below. Show your working out. (14 marks)

**a.** $Na + Cl_2 \rightarrow NaCl$

1 x Na
2 x Cl

1 x Na (0.5)
1 x Cl

$2Na + Cl_2 \rightarrow 2NaCl$
(0.5) (1)

2 x Na
2 x Cl

2 x Na
2 x Cl

**b.** $Al + O_2 \rightarrow Al_2O_3$

1 x Al
2 x O

2 x Al
3 x O

$4Al + 3O_2 \rightarrow 2Al_2O_3$

4 x Al
6 x O

4 x Al
6 x O

**c.** $S_8 + O_2 \rightarrow SO_2$

8 x S
2 x O

1 x S
2 x O

$S_8 + 8O_2 \rightarrow 8SO_2$

**d.** $Ca + H_2O \rightarrow Ca(OH)_2 + H_2$

1 x Ca
2 x H
1 x O

1 x Ca
4 x H
2 x O

$Ca + 2H_2O \rightarrow Ca(OH)_2 + H_2$

1 x Ca
4 x H
2 x O

1 x Ca
4 x H
2 x O

**e.** $V_2O_5 + CaS \rightarrow CaO + V_2S_5$

2 x V
5 x O
1 x Ca
1 x S

2 x V
1 x O
1 x Ca
5 x S

$V_2O_5 + 5CaS \rightarrow 5CaO + V_2S_5$

2 x V
5 x O
5 x Ca
5 x S

2 x S
5 x O
5 x Ca
5 x S

0.5 mark for working out

0.5 mark for formula equation

1 mark for correct numbers added in front to balance

**f.** $Fe_2O_3 + C \rightarrow CO_2 + Fe$

2 x Fe
3 x O
1 x C

1 x Fe
2 x O
1 x C

$2Fe_2O_3 + 3C \rightarrow 3CO_2 + 4Fe$

4 x Fe
6 x O
3 x C

4 x Fe
6 x O
3 x C

**g.** $Al + HCl \rightarrow AlCl_3 + H_2$

1 x Al
1 x H
1 x Cl

1 x Al
2 x H
3 x Cl

$2Al + 6HCl \rightarrow 2AlCl_3 + 3H_2$

2 x Al
6 x H
6 x Cl

2 x Al
6 x H
6 x Cl

**6.** Write the chemical formula for each of the following substances and include the appropriate state for each one. (6 marks)

**a.** Hydrogen

$H_2(g)$ (0.5) (0.5)

**b.** Potassium carbonate crystals

$K_2CO_3(s)$ (0.5) (0.5)

**c.** Dilute sulphuric acid

$H_2SO_4(aq)$ (0.5) (0.5)

**d.** Dilute hydrochloric acid

$HCl(aq)$ (0.5) (0.5)

**e.** Water

$H_2O(l)$ (0.5) (0.5)

**f.** Calcium carbonate

$CaCO_3(s)$ (0.5) (0.5)

**7.** Clear silver nitrate solution is mixed with a clear sodium chloride solution. White silver chloride precipitates out, leaving behind a clear solution of sodium nitrate.

(2 marks)

**a.** Write a word equation including the states of each substance.

silver nitrate (aq) + sodium chloride (aq) → silver chloride (s) + sodium nitrate (aq)

1 mark for word equation
1 mark for correct states

**b.** Write a balanced formula equation including the states of each substance. (2 marks)

$AgNO_3(aq) + NaCl(aq) \rightarrow AgCl(s) + NaNO_3(aq)$

1 mark for word equation
1 mark for correct states

**8a.** Write an example of a chemical reaction that has a slow rate of reaction. (0.5 marks)

Rusting, ripening & fermentation of wine
rotting of food.

**b.** Write an example of a chemical reaction that has a fast rate of reaction (0.5 marks)

Explosion, combustion
Burning of gas in Bunsen burner
vinegar mixed with bicarbonate of soda

**9.** Luke is developing a new chemical reaction for converting iron ore into iron metal. He wants to work out how adding a catalyst changes the rate of reaction. To do this, Luke measures the amount of iron metal produced by the chemical reaction every minute for the first 5 minutes. His data is in the table below.

Draw a graph using the information from the table below. (5 marks)
Don't forget all the things that a graph needs!

-1 mark for:
not in pencil
not with ruler
bar instead of line graph
not neat
incorrect heading
missing units of measurement
incorrect title (missing variable)
inappropriate scale
headings on wrong axis

| Iron produced (g) | Time (minutes) |
|---|---|
| 0 | 0 |
| 20 | 1 |
| 42 | 2 |
| 53 | 3 |
| 60 | 4 |
| 68 | 5 |

Iron produced versus time

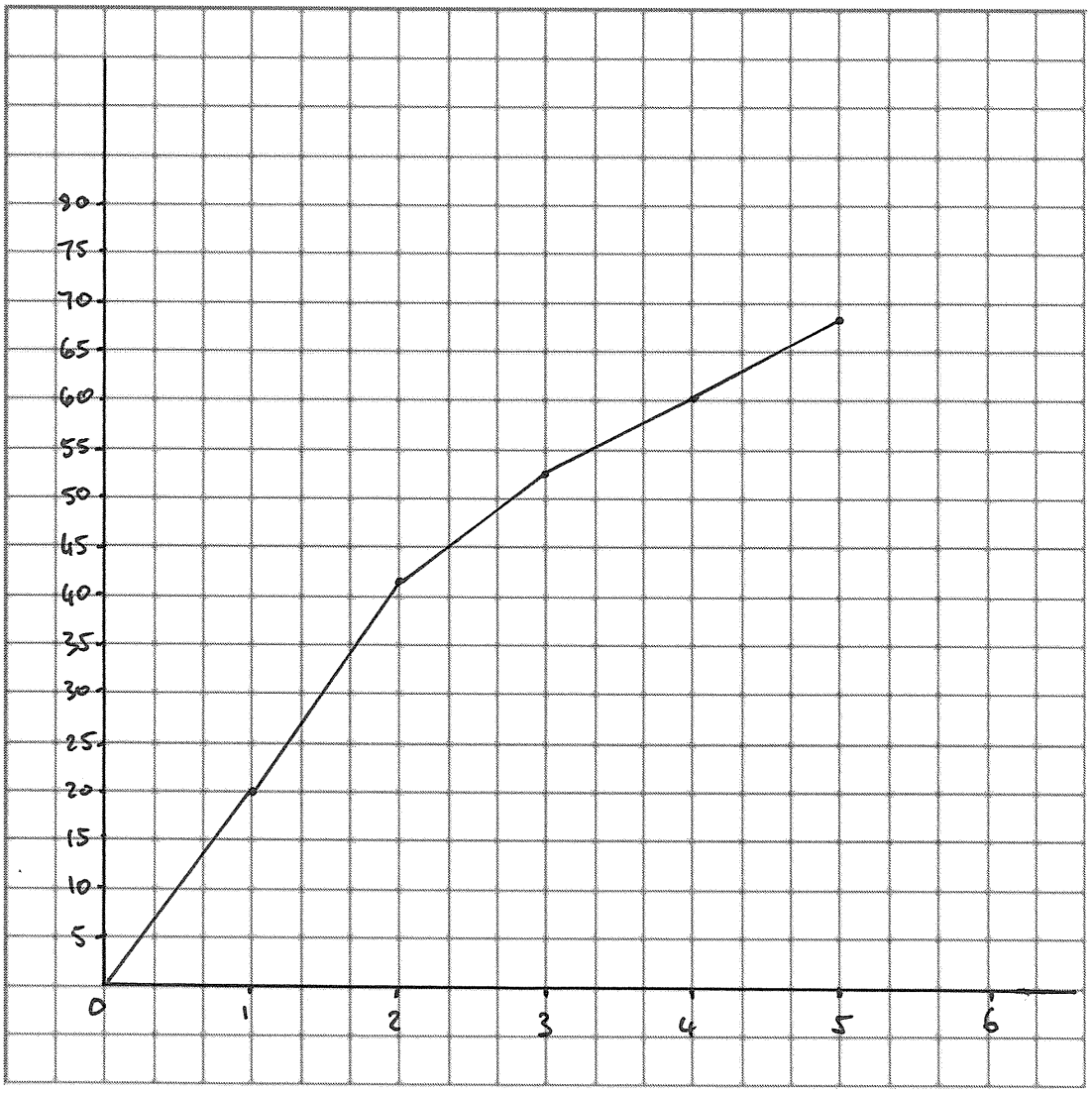


**Table of common ions**

| +1 charge | | - 1 charge | |
|---|---|---|---|
| Hydrogen | $H^+$ | Fluoride | $F^-$ |
| Lithium | $Li^+$ | Chloride | $Cl^-$ |
| Sodium | $Na^+$ | Bromide | $Br^-$ |
| Potassium | $K^+$ | Iodide | $I^-$ |
| Copper (I) | $Cu^+$ | Hydride | $H^-$ |
| Silver | $Ag^+$ | Hydroxide | $OH^-$ |
| Ammonium | $NH_4^+$ | Nitrite | $NO_2^-$ |
| | | Nitrate | $NO_3^-$ |
| **+2 charge** | | **- 2 charge** | |
| Manganese | $Mn^{2+}$ | Oxide | $O^{2-}$ |
| Magnesium | $Mg^{2+}$ | Sulfide | $S^{2-}$ |
| Calcium | $Ca^{2+}$ | Carbonate | $CO_3^{2-}$ |
| Barium | $Ba^{2+}$ | Sulfate | $SO_4^{2-}$ |
| Zinc | $Zn^{2+}$ | Sulfite | $SO_3^{2-}$ |
| Copper (II) | $Cu^{2+}$ | | |
| Mercury (II) | $Hg^{2+}$ | | |
| Iron (II) | $Fe^{2+}$ | | |
| Tin (II) | $Fe^{2+}$ | | |
| Lead (II) | $Pb^{2+}$ | | |
| Nickel (II) | $Ni^{2+}$ | | |
| Beryllium | $Be^{2+}$ | | |
| **+3 charge** | | **- 3 charge** | |
| Aluminium | $Al^{3+}$ | Nitride | $N^{3-}$ |
| Iron (III) | $Fe^{3+}$ | Phosphate | $PO_4^{3-}$ |
| Chromium (III) | $Cr^{3+}$ | Phosphide | $P^{3-}$ |
| Boron | $B^{3+}$ | | |