# 10 Chemistry Exam Revision

**1.** For the following examples determine whether they are a metal, a non-metal, a semi-metal (metalloid), or a noble gas.

a. Ca
b. Si
c. Br
d. Co
e. Ar
f. K
g. O
h. Se
i. As
j. Mn
k. Kr
l. H

**2.** Using examples, define the terms:

a. atomic number
b. mass number
c. isotope
d. cation
e. anion
f. polyatomic ion
g. soluble
h. insoluble

**3.** Name the following groups on the periodic table:

a. 1
b. 2
c. 17
d. 18

**4.** Complete the table below:

| Element | Charge | Mass No. | Atomic No. | No. Protons | No. Neutrons | No. Electrons |
|---|---|---|---|---|---|---|
| $^{59}_{27}Co$ | neutral | | | | | |
| $^{112}_{48}Cd^{2+}$ | | | | | | |
| | neutral | 80 | | | 45 | |
| $P^{3-}$ | | 31 | 15 | | | |
| | | | | 38 | 50 | 36 |

**5.** Complete the table below for **ionic compounds:**
Use ions table; Do **not** use mono, di, tri etc.

| Name | Formula |
|---|---|
| Potassium chloride | |
| Magnesium chloride | |
| Aluminium chloride | |
| Sodium nitrate | |
| Sodium carbonate | |
| Sodium phosphate | |
| Calcium nitrite | |
| Calcium nitrate | |
| Calcium nitride | |
| Zinc sulphite | |
| Zinc sulphate | |
| Zinc sulphide | |
| Iron (II) oxide | |
| Iron (III) oxide | |
| Copper (I) hydroxide | |
| Copper (II) hydroxide | |
| Ammonium nitrate | |
| Ammonium iodide | |
| Ammonium sulphate | |
| | $AgCl$ |
| | $AgCH_3COO$ |
| | $Ag_2O$ |
| | $MgO$ |
| | $Mg_3(PO_4)_2$ |
| | $SnCO_3$ |
| | $SnCl_4$ |
| | $NaHCO_3$ |
| | $Ba(CH_3COO)_2$ |

**6.** Complete the table below for **<u>covalent compounds</u>**:
Do not use ions table; Use mono, di, tri, tetra, penta, hexa, hepta, octa, nona, deca

| Name | Formula |
|---|---|
| | $SO_2$ |
| | $SO_3$ |
| Carbon monoxide | |
| Carbon dioxide | |
| Trisulfur octaoxide | |
| | $P_2F_6$ |
| | $N_2O_5$ |
| | $N_2O_3$ |

**7.** Balance the following equations:

$H_{2(g)} + O_{2(g)} \rightarrow H_2O_{(g)}$

$N_{2(g)} + H_{2(g)} \rightarrow NH_{3(g)}$

$C_4H_{10(g)} + O_{2(g)} \rightarrow CO_{2(g)} + H_2O_{(l)}$

$NaMnO_{4(aq)} + H_2O_{2(l)} + H_2SO_{4(aq)} \rightarrow MnSO_{4(aq)} + Na_2SO_{4(aq)} + O_{2(g)} + H_2O_{(l)}$

$NH_{3(g)} + O_{2(g)} \rightarrow NO_{(g)} + H_2O_{(l)}$

**8.** Write balanced chemical equations for the following reactions:

**i.** The decomposition of aluminium carbonate forming aluminium oxide and carbon dioxide.
**ii.** The decomposition of tin (IV) hydrogencarbonate forming water, carbon dioxide and tin (IV) oxide.
**iii.** Chromium is added to bromine gas forming chromium bromide.
**iv.** The decomposition of lithium hydrogencarbonate, forming lithium oxide, water and carbon dioxide.
**v.** Ammonium carbonate solution reacts with manganese (II) iodide solution to produce ammonium iodide solution and a manganese carbonate precipitate.
**vi.** Aluminium nitrate solution reacts with potassium hydroxide solution to produce potassium nitrate solution and a precipitate of aluminium hydroxide.
**vii.** Sodium bromide solution is added to zinc sulfate and the two solutions only mix together and do not produce any new products.
**viii.** Solid lead (II) nitrate is dissolved in water. (Extension only)

**9.** Name the common chemical tests for the following gases

a. carbon dioxide
b. hydrogen
c. oxygen

**10.** Write the electron configurations for the following substances.

**i.** C
**ii.** Ne
**iii.** Na
**iv.** $O^{2-}$
**v.** $Ca^{2+}$
**vi.** $N^{3-}$

**11.** Draw Lewis (electron dot) diagrams for the following:

**i.** C*l*
**ii.** A*l*
**iii.** $Mg^{2+}$
**iv.** $F^{-}$
**v.** $S^{2-}$
**vi.** He

**12.** Using examples, describe the relationship between the number of energy shells (levels) and valence electrons an atom has and its position on the periodic table.

**13.** In the following reaction; $CaCO_{3(s)} + 2HCl_{(aq)} \rightarrow CaCl_{2(aq)} + CO_{2(g)} + H_2O_{(l)}$ , describe:

**i.** Two ways to measure the reaction rate.
**ii.** Explain three ways to speed this reaction up (i.e., describe how the reaction rate increases rather than just listing how it could be sped up).

**14.** List the 3 requirements for a reaction to occur according to collision theory.

**15.** Use collision theory to explain in detail how each of the following factors can increase reaction rate:

a. Temperature
b. Concentration
c. Agitation
d. Surface area
e. Catalysts

**16.** A group of students carried out an investigation to see how the concentration of acid affects the rate of the reaction between hydrochloric acid and chalk. Chalk contains calcium carbonate. They dropped a 3 cm piece of chalk into hydrochloric acid of different concentrations. They caught and measured the amount of carbon dioxide that was produced in 1 minute.

a. Name the following **variables** in this experiment:
    i. Independent
    ii. Dependent
    iii. **Two (2)** controlled variables:

**Results:**

| **Concentration (%)** | **Volume of $CO_2$ generated ($cm^3$)** |
|---|---|
| 50 | 200 |
| 30 | 130 |
| 15 | 65 |
| 10 | 38 |
| 5 | 22 |

b. Draw a graph of the results.

c. Write a conclusion for the experiment.

## Extension

**17.** Write balanced ionic equations for the following reactions:

a. solutions of iron (II) sulfate and barium hydroxide are mixed
b. solutions of calcium chloride and potassium phosphate are mixed
c. solutions of calcium nitrate and sodium chloride are mixed
d. solution of potassium chloride and silver nitrate are mixed
e. solutions of sodium sulfide and nickel (II) sulfate are mixed
f. solutions of ammonium sulfate and barium chloride are mixed
g. solutions of sodium sulfide and zinc sulfate are mixed
h. solutions of aluminium nitrate and sodium phosphate are mixed
i. solutions of ammonium carbonate and magnesium sulfate are mixed
j. solutions of sodium sulfate and potassium sulfide are mixed
k. solutions of lead (II) nitrate and lithium iodide are mixed

**18.** Calculate the molar mass of the following:

a. $KMnO_4$
b. lithium nitrite
c. $PbO_2$
d. iron (III) hydroxide
e. dinitrogen tetroxide

**19.** Calculate the number of moles of the following:

**i.** $SO_3$ molecules in 143.4 g of $SO_3$
**ii.** $Li_3PO_4$ formula units in 796.2 g of $Li_3PO_4$
**iii.** O atoms in 963.4 g of $Sr_3(PO_4)_2$

**20.** Calculate the mass of the following:

**i.** $6.53\times10^{4}$ mol of $Zn(NO_2)_2$
**ii.** $2.67\times10^{-2}$ mol of $CrI_3$
**iii.** $Sn(OH)_4$ that contains 32.7 mol of H atoms
**iv.** O atoms in 986.5g of $Fe(HSO_4)_3$

**21.** Define the mole.