🏠 ESSENTIALS 1

1) a) What is the difference between an element and a compound? (2)

b) All substances are made up of three types of particle: atoms, molecules or ions. Explain what atoms, molecules and ions are. (3)

c) Identify each of the following particles as an atom, molecule and/or ion.

NH_3 O^{2-} SO_4^{2-} F_2 O O_2 NO_3^- H_2O Cl H^+ (10)

2) Write the formula of the following substances. Some are ionic, some are atomic and some are molecular.

a) lithium oxide

b) calcium nitrate

c) methane

d) ammonium sulphate

e) ammonia

f) nitrogen

g) argon

h) iron (III) hydroxide (8)

3) Balance the following equations.

a) $Fe + H_2O \rightarrow Fe_3O_4 + H_2$ (1)

b) $PCl_3 + H_2O \rightarrow P(OH)_3 + HCl$ (1)

c) ammonia + oxygen → nitrogen + water (2)

d) ethane + oxygen → carbon dioxide + water (2)

4) Complete the following calculations, giving your answers to three significant figures.

a) $32420 + 762891$ b) $12000 \div 1000$ c) $0.06438 + 0.0004378$ d) $180 \div 90$ (4)

5) The following results are accurately measured values from experiments. Complete the sum and give the answer to the most number of significant figures that you think gives an answer that is trustworthy.

a) $1.4567 + 2.3$ b) $10.5 - 0.145$ c) $3.000 - 0.056$ d) $8693.457 + 1.2367$ (4)

6) Rearrange the following equations to give the letter shown as the subject.

a) What does c equal if $q = mcT$?

b) What does T equal if $G = H - TS$

c) What does q equal if $E = \dfrac{3pq}{2r}$

d) What does n equal if $PV = nRT$?

e) What does c equal if $2a = 3(b - 2c)$

f) What does T equal if $F = mc + \dfrac{Rk}{T}$ (6)

Challenge for the week

7) Balance the following equations.

a) $KMnO_4 + HCl \rightarrow KCl + MnCl_2 + Cl_2 + H_2O$ (1)

b) $As_4O_6 + S_2Cl_2 + Cl_2 \rightarrow AsCl_2 + SO_2$ (1)