

# EMPIRICAL & MOLECULAR FORMULAE



Name ..... Form .....

- 1) Write the empirical formula of each of the following substances.
- |                |              |                |                         |
|----------------|--------------|----------------|-------------------------|
| a) $C_2H_6$    | b) $P_2O_3$  | c) $SO_2$      | d) $C_6H_{12}$          |
| e) $C_2H_4O_2$ | f) $C_2H_7N$ | g) $B_6H_{10}$ | h) $C_{12}H_{22}O_{11}$ |
- 2) The empirical formula and relative molecular mass of some compounds are shown below. Work out the molecular formula of each one.
- |                        |                      |
|------------------------|----------------------|
| a) $NH_2$ $M_r = 32$   | d) $PH_3$ $M_r = 34$ |
| b) $C_2H_5$ $M_r = 58$ | e) $CH$ $M_r = 78$   |
| c) $CH_2$ $M_r = 70$   | f) $CH_2$ $M_r = 42$ |
- 3) Find the simplest whole number ratio for each of the following. The numbers come from experiments so there will be some small random errors which mean that you can round the numbers a little bit.
- |             |             |             |             |
|-------------|-------------|-------------|-------------|
| a) 1.5 : 1  | b) 1 : 1.98 | c) 4.97 : 1 | d) 1 : 2.52 |
| e) 1 : 1.33 | f) 1.66 : 1 | g) 1 : 1.26 | h) 1 : 1.74 |
- 4) Find the empirical formulae of the following compounds using the data given.
- |              |          |          |
|--------------|----------|----------|
| a) Ca 20 %   | Br 80 %  |          |
| b) Na 29.1 % | S 40.5 % | O 30.4 % |
| c) C 53.3 %  | H 15.5 % | N 31.1 % |
| d) C 2.73 g  | O 7.27 g |          |
| e) N 15.2 g  | O 34.8 g |          |
- 5) 3.53 g of iron reacts with chlorine to form 10.24 g of iron chloride. Find the empirical formula of the iron chloride.
- 6) 50.0 g of a compound contains 22.4 g of potassium, 9.2 g of sulphur, and the rest oxygen. Calculate the empirical formula of the compound.
- 7) An oxide of phosphorus contains 56.4 % phosphorus and 43.6 % oxygen. Its relative molecular mass is 220. Find both the empirical and the molecular formula of the oxide.
- 8) A compound contains 40.0 g of carbon, 6.7 g of hydrogen and 53.5 g of oxygen. It has a relative molecular formula of 60. Find both the empirical and the molecular formula of the compound.
- 9) An organic compound X, which contains carbon, hydrogen and oxygen only, has an  $M_r$  of 85. When 0.43 g of X are burned in excess oxygen, 1.10 g of carbon dioxide and 0.45 g of water are formed. Find the empirical and molecular formulae of compound X.