

Sodium: Answers

1. (a) $\text{Na}^+ + \text{e}^- \rightarrow \text{Na}$ [1]
 $2\text{Cl}^- \rightarrow \text{Cl}_2 + 2\text{e}^-$ [2]
One mark for correct species and one mark for balancing.
- (b) (i) $\frac{100 \times 40\,000 \times 24 \times 60 \times 60}{96,000} \text{ F}$ [1]
 $= 3,600,000 \text{ F}$ [1]
- (ii) 1 F produces 23 g of sodium [1]
3,600,000 F produces $\frac{23 \times 3,600,000}{1000} \text{ kg}$ [1]
 $= 82.8 \text{ tonnes}$ [1]
2. (a) 0.05 tonnes [1]
- (b) From the equation
36 tonnes of water produces 2 tonnes of hydrogen [1]
0.05 tonnes of water produces $\frac{2 \times 0.05}{36}$ tonnes of hydrogen [1]
 $= 2.78 \text{ kg}$ [1]
- (c) There are different ways of doing this calculation
2 g of hydrogen occupies 24 dm^3 [1]
2780 g of hydrogen occupies $\frac{24 \times 2780}{2} \text{ dm}^3$
 $= 33,360 \text{ dm}^3$ [1]