

1. Find the mass of the following substances:

a) 2 moles of silver metal

$$m(\text{Ag}) = n(\text{Ag}) * M(\text{Ag})$$

$$m(\text{Ag}) = 2 * 108 = 216 \text{ g} \quad 1 \text{ mark}$$

b) 4.2 moles of water

$$m(\text{H}_2\text{O}) = n(\text{H}_2\text{O}) * M(\text{H}_2\text{O})$$

$$m(\text{H}_2\text{O}) = 4.2 * (2 * 1 + 16) = 75.6 \text{ g} \quad 1 \text{ mark}$$

c) 3.7 moles of oxygen gas

$$m(\text{O}_2) = n(\text{O}_2) * M(\text{O}_2)$$

$$m(\text{O}_2) = 3.7 * (2 * 16) = 118 \text{ g} \quad 1 \text{ mark}$$

2. Find the number of moles of the following substances

a) 17 g of carbon

$$n(\text{C}) = \frac{m(\text{C})}{M(\text{C})} = \frac{17}{12} = 1.4 \text{ mol} \quad 1 \text{ mark}$$

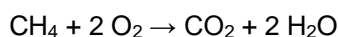
b) 300 g of carbon dioxide

$$n(\text{CO}_2) = \frac{m(\text{CO}_2)}{M(\text{CO}_2)} = \frac{300}{12+2*16} = 6.82 \text{ mol} \quad 1 \text{ mark}$$

c) 82 g sulphuric acid

$$n(\text{H}_2\text{SO}_4) = \frac{m(\text{H}_2\text{SO}_4)}{M(\text{H}_2\text{SO}_4)} = \frac{82}{2*1+32+4*16} = 0.84 \text{ mol} \quad 1 \text{ mark}$$

3. Methane can burn in the presence of oxygen gas to produce carbon dioxide gas and water vapour. The chemical equation is:



a) how many moles of water can be produced by 4.8 mol of methane?

$$n(\text{H}_2\text{O}) = n(\text{CH}_4) * \frac{cf(\text{H}_2\text{O})}{cf(\text{CH}_4)} \quad 1 \text{ mark}$$

$$n(\text{H}_2\text{O}) = 4.8 * \frac{2}{1} = 9.6 \text{ mol} \quad 1 \text{ mark}$$

b) how many moles of carbon dioxide can be produced by 1.3 mol of oxygen gas?

$$n(\text{CO}_2) = n(\text{O}_2) * \frac{cf(\text{CO}_2)}{cf(\text{O}_2)} \quad 1 \text{ mark}$$

$$n(\text{CO}_2) = 1.3 * \frac{1}{2} = 0.65 \text{ mol} \quad 1 \text{ mark}$$

c) What mass of methane is required to produce 150 g of water?

$$n(\text{H}_2\text{O}) = \frac{m(\text{H}_2\text{O})}{M(\text{H}_2\text{O})} = \frac{150}{18} = 8.33 \text{ mol} \quad 1 \text{ mark}$$

$$n(\text{CH}_4) = n(\text{H}_2\text{O}) * \frac{cf(\text{CH}_4)}{cf(\text{H}_2\text{O})}$$

$$n(\text{CH}_4) = 8.33 * \frac{1}{2} = 4.17 \text{ mol} \quad 1 \text{ mark}$$

$$m(\text{CH}_4) = n(\text{CH}_4) * M(\text{CH}_4)$$

$$m(\text{CH}_4) = 4.17 * (12 + 4 * 1) = 66.7 \text{ g} \quad 1 \text{ mark}$$