

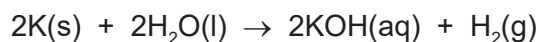
SMART EXAM RESOURCES
SUBJECT: CHEMISTRY
TOPIC: STOICHIOMETRY
SET-5-QP-MS

VOLUME OF GAS

1

When potassium is added to water, it reacts vigorously and a coloured flame is seen.

The equation for the reaction is shown.



- (c) (iv) Calculate the volume, in cm^3 , of hydrogen gas formed when 2.34 g of potassium is added to excess water at room temperature and pressure.

Use the following steps.

- Calculate the number of moles of potassium added.

= mol

- Determine the number of moles of hydrogen gas formed.

= mol

- Calculate the volume of hydrogen gas formed.

volume = cm^3
[3]

MARK SCHEME:

	M1 mol of K = $2.34 / 39 = 0.06(00)$ (1) M2 mol of H ₂ = $0.06 / 2 = 0.03(00)$ (1) M3 volume of H ₂ = $0.03 \times 24\,000 = 720\text{ cm}^3$ (1)	3
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2

The equation for the reaction is shown.



25.0 cm³ of 2.00 mol/dm³ H₂SO₄(aq) is added to excess zinc.

Calculate the volume of H₂ formed at room temperature and pressure (r.t.p.). The volume of one mole of any gas is 24 dm³ at r.t.p.

Use the following steps.

- Calculate the number of moles of H₂SO₄ used.

..... mol

- Deduce the number of moles of H₂ produced.

..... mol

- Calculate the volume of H₂ formed at r.t.p.

..... dm³
[3]

MARK SCHEME:

M1 $\text{mol H}_2\text{SO}_4 = 2.00 \times 25.0/1000 = 0.05(00)$	3
M2 $\text{mol H}_2 = \text{M1} = 0.05(00)$	
M3 $\text{vol H}_2 = \text{M2} \times 24 = 1.2(0)$	

3

When solid copper(II) nitrate is heated copper(II) oxide, nitrogen dioxide and oxygen are formed.



Calculate the volume of nitrogen dioxide formed at room temperature and pressure when 4.7 g of $\text{Cu}(\text{NO}_3)_2$ is heated.

Use the following steps:

- calculate the mass of one mole of $\text{Cu}(\text{NO}_3)_2$

..... g

- calculate the number of moles of $\text{Cu}(\text{NO}_3)_2$ used

..... moles

- determine the number of moles of nitrogen dioxide formed

..... moles

- calculate the volume of nitrogen dioxide formed at room temperature and pressure.

..... dm^3
[4]

MARK SCHEME:

M1 188	4
M2 $4.7 / 188 = 0.025(0)$	
M3 $0.025(0) \times 2 = 0.05(0)$	
M4 $0.05(0) \times 24.0 = 1.2$	

4

Sodium hydrogencarbonate is found in baking powder.

When sodium hydrogencarbonate is heated it forms three products.



(b) Calculate the volume of carbon dioxide formed at room temperature and pressure when 12.6 g of NaHCO_3 is heated using the following steps:

- determine the mass of one mole of NaHCO_3

..... g

- calculate the number of moles of NaHCO_3 used

..... moles

- determine the number of moles of carbon dioxide formed

..... moles

- calculate the volume of carbon dioxide formed at room temperature and pressure.

..... dm^3
[4]

MARK SCHEME:

84 (1) $12.6 / 84 = 0.15(00)$ (1) $0.15(00) / 2 = 0.075(00)$ (1) $0.075(0) \times 24.0 = 1.8$ (1)	4
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