

- 9 Aqueous barium hydroxide,  $\text{Ba}(\text{OH})_2$ , reacts with dilute nitric acid,  $\text{HNO}_3$ . The products are aqueous barium nitrate,  $\text{Ba}(\text{NO}_3)_2$ , and water.

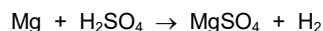
In a titration,  $15.2\text{ cm}^3$  of  $0.75\text{ mol/dm}^3$  aqueous barium hydroxide is required to neutralise  $20.0\text{ cm}^3$  of dilute nitric acid.

What is the concentration of the nitric acid?

- A**  $0.29\text{ mol/dm}^3$   
**B**  $0.57\text{ mol/dm}^3$   
**C**  $1.14\text{ mol/dm}^3$   
**D**  $2.03\text{ mol/dm}^3$

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- 10 The equation for the reaction of magnesium with dilute sulfuric acid is shown.



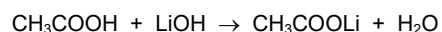
[ $M_r$ :  $\text{MgSO}_4$ , 120]

Which mass of magnesium sulfate is formed when 12 g of magnesium completely reacts with dilute sulfuric acid?

- A** 5 g                      **B** 10 g                      **C** 60 g                      **D** 120 g

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- 8 The equation for the reaction between dilute ethanoic acid and aqueous lithium hydroxide is shown.



In an experiment,  $20.0\text{ cm}^3$  of  $0.050\text{ mol/dm}^3$  aqueous lithium hydroxide is exactly neutralised by  $12.5\text{ cm}^3$  of dilute ethanoic acid.

Which statement is correct?

- A** The amount of lithium hydroxide is equal to  $0.050 \times \frac{1000}{20}$  mol.  
**B** The amount of ethanoic acid reacted is  $0.0010$  mol.  
**C** The concentration of the dilute ethanoic acid is  $0.16\text{ mol/dm}^3$ .  
**D** The volume of aqueous lithium hydroxide used is  $0.20\text{ dm}^3$ .

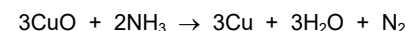
- 9 The molecular formulae of four compounds are listed.

- 1  $\text{CH}_4$   
2  $\text{C}_2\text{H}_6$   
3  $\text{C}_3\text{H}_8$   
4  $\text{C}_3\text{H}_6$

Which molecular formulae are also the empirical formulae for the compounds?

- A** 1 and 2                      **B** 1 and 3                      **C** 2 and 4                      **D** 3 and 4

- 10 The equation for the reaction between copper(II) oxide,  $\text{CuO}$ , and ammonia is given.



[ $M_r$ :  $\text{CuO}$ , 80;  $\text{NH}_3$ , 17;  $\text{H}_2\text{O}$ , 18;  $\text{N}_2$ , 28]

[ $A_r$ : Cu, 64]

Which statements about this reaction are correct?

- 1 80.0 g of copper(II) oxide reacts exactly with 17.0 g of ammonia.  
2 4.0 g of copper(II) oxide reacts with excess ammonia to produce 3.2 g of copper.  
3 The mass of water produced in this reaction is greater than the mass of nitrogen.

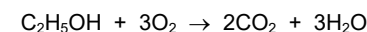
- A** 1, 2 and 3                      **B** 1 and 2 only                      **C** 1 and 3 only                      **D** 2 and 3 only

- 11 How many atoms are present in  $1.00\text{ mol}$  of argon?

- A**  $2.06 \times 10^{23}$                       **B**  $3.02 \times 10^{26}$                       **C**  $6.02 \times 10^{23}$                       **D**  $6.32 \times 10^{20}$

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- 10 The equation for the combustion of ethanol is shown.



The relative molecular mass,  $M_r$ , of ethanol is 46.

Which statement about the reaction is correct?

- A** 4.6 g of ethanol produces 4.4 g of carbon dioxide.  
**B** 92 g of ethanol produces 88 g of carbon dioxide and 108 g of water.  
**C** 138 g of ethanol reacts with 32 g of oxygen.  
**D** 184 g of ethanol produces 216 g of water.

11 A compound contains 40.0% carbon, 6.7% hydrogen and 53.3% oxygen only.

The relative molecular mass,  $M_r$ , of the compound is 60.

Which row shows the empirical formula and the molecular formula of the compound?

|          | empirical formula                            | molecular formula                            |
|----------|----------------------------------------------|----------------------------------------------|
| <b>A</b> | CH <sub>2</sub> O                            | CH <sub>2</sub> O                            |
| <b>B</b> | CH <sub>2</sub> O                            | C <sub>2</sub> H <sub>4</sub> O <sub>2</sub> |
| <b>C</b> | C <sub>3</sub> H <sub>7</sub> O <sub>3</sub> | C <sub>3</sub> H <sub>7</sub> O <sub>3</sub> |
| <b>D</b> | C <sub>3</sub> H <sub>8</sub> O              | C <sub>3</sub> H <sub>8</sub> O              |

9 Which compound has an empirical formula that is the same as its molecular formula?

- A** butane
- B** but-1-ene
- C** butanoic acid
- D** butan-1-ol

10 Which row identifies the charge on the chromium ion and on the sulfate ion in Cr<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub>?

|          | Cr | SO <sub>4</sub> |
|----------|----|-----------------|
| <b>A</b> | 2+ | 3–              |
| <b>B</b> | 2– | 3+              |
| <b>C</b> | 3+ | 2–              |
| <b>D</b> | 3– | 2+              |