

1.2 PRACTICE EXAMINATION QUESTIONS MARK SCHEME

1. (a) (i) Avogadro's number/constant of molecules/particles/species / 6×10^{23} 1
[Not 'atoms']
- Or** same number of particles as (there are atoms)
[Not molecules]
 in 12.(00)g of ^{12}C 1
- (ii) Moles $\text{O}_2 = \frac{0.350}{32} (= 1.09 \times 10^{-2} \text{ mol})$ 1
 $= 29 (\times 1.09 \times 10^{-2})$ 1
[Accept answers via 4 separate mole calculations]
 $= 0.316 - 0.317 \text{ mol}$ [answer to 3+ sf] 1
[Mark conseq on errors in M1/M2] (1)
- (iii) Moles of nitroglycerine = $4 \times 1.09 \times 10^{-2}$ (= 0.0438 mol) 1
[Mark conseq on their moles of O_2]
- M_r of nitroglycerine = 227 or number string 1
- Moles of nitroglycerine = $227 \times 0.0438 = 9.90 - 9.93(\text{g})$
[answer to 3+ sf]
[If string OK but final answer wrong then allow M6 but AE for M7]
[Mark conseq on error in M_r] [Penalise wrong units]
[Penalise sig. fig. errors once only in whole question]
- (b) $pV = nRT$ **or** $pV = \frac{mRT}{V}$ **or** $p = \frac{nRT}{V}$ 1
- $p = \frac{nRT}{V} = \frac{0.873 \times 8.31 \times 1100}{1.00 \times 10^{-3}}$ 1
- $= 7980093$ **or** 7980 **or** 7.98 1
[ignore s.f.]
- units = Pa **or** kPa **or** MPa (as appropriate) 1
[If error in conversion from Pa, treat as a contradiction of the units mark]
[If transfer error, mark conseq but penalise M2]
[If data from outside of above used, penalise M2 and M3]
[If pV expression incorrectly rearranged, penalise M2 and M3]
[if $T = 1373 \text{ K}$ used, penalise M2]

[11]

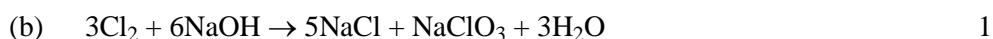
2.

	<u>Na</u>	<u>Cl</u>	<u>O</u>	
	$\frac{21.6}{23}$	$\frac{33.3}{35.5}$	$\frac{45.1}{16}$	1
	0.9(39)	0.9(38)	2.8(2)	
Hence:	1	1	3	1

Accept backwards calculation, i.e. from formula to % composition, and also accept route via M_r to 23; 35.5; 48, and then to 1:1:3

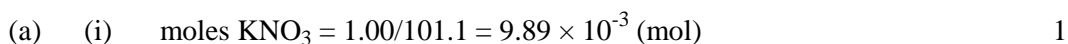
[If % values incorrectly copied, allow M1 only]

[If any wrong A_r values/atomic numbers used = CE = 0]



[3]

3. (penalty for sig fig error = 1 mark per question)



$$\text{moles O}_2 = n = \frac{pV}{RT} = \text{(1)} \frac{100000 \times 1.22 \times 10^{-4}}{8.31 \times 298} \text{ (1)} \quad \text{2}$$

$$= 4.93 \times 10^{-3} \text{ (mol)} \quad \text{1}$$

(mark answer first – check back if wrong)

(transcription error lose M3, mark M4 conseq on error)

(if ‘untraceable’ figures used M3=M4=0)

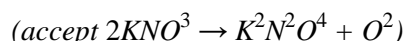
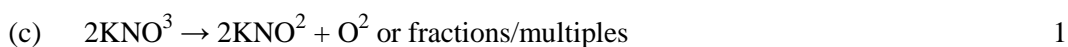
(if wrong temp conversion – lose M3 – conseq M4)

(if $n = RT/pV$ CE, lose M3 and M4)

(b) (i) simplest/lowest ratio of atoms of each / element/s in a compound / substance / species / entity / molecule 1

	<u>K</u>	<u>N</u>	<u>O</u>		
	$\frac{45.9}{39.1}$	$\frac{16.5}{14}$	$\frac{37.6}{16}$	(1)	
	1.17	1.18	2.35		
	1	1	2	KNO_2	(1)

(M3 tied to M2), (M3 can be transferred from equation if ratio correct but EF not given) (if calc inverted, lose M2 and M3), (if used At N_1 / wrong No for Ar then CE, lose M2 and M3) (if % of O missing, award M2 only)



(do NOT accept ‘Y’ in equation)

[10]

4. (penalty for sig fig error = 1 mark per question)

$$M_r(\text{Mg}(\text{NO}_3)_2) = 58(.3) \text{ (if At } N^\circ \text{ used, lose M1 and M2)} \quad 1$$

$$\text{moles Mg}(\text{OH})_2 = 0.0172 \text{ (conseq on wrong } M^2) \text{ (answer to } \underline{3+} \text{ s.f.)} \quad 1$$

$$\text{moles HCl} = 2 \times 0.0172 = 0.0344 \text{ or } 0.0343 \text{ (mol) (process mark)} \quad 1$$

$$\text{vol HCl} = \frac{0.0343 \times 1000}{1} = 34.3 - 34.5 \text{ (cm}_3) \text{ (unless wrong unit)} \quad 1$$

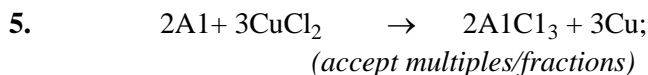
(if candidate **used** 0.017 or 0.0171 lose M2)

(just answer with no working, if in range = (4). if, say, 34 then =(2))

(if not 2:1 ratio, lose M3 and M4)

(if work on HCl, CE = 0/4)

[4]



OR



[1]

6. (a) moles $\text{HNO}_3 = 175 \times 10^{-3} \times 1.5 = (0.2625 \text{ mol}); \quad 1$

moles $\text{Pb}(\text{NO}_3)_2 = \frac{1}{2} \times 0.2625 = (0.131 \text{ mol}); \quad 1$

$M_r \text{ Pb}(\text{NO}_3)_2 = 331(.2); \quad 1$

mass $\text{Pb}(\text{NO}_3)_2 = 331.2 \times 0.131 = 43.5 \text{ g}; \quad 1$

(accept 43.2 - 43.8)

(M1 & M2 are process marks. If error in M1, or in M2, do not mark M4

consequentially, i.e. do not award M4)

(if atomic numbers used in M3, do not award M4)

(b) (i) $pV = nRT; \quad 1$

$$n = \frac{pV}{RT} = \frac{100000 \times 1.5 \times 10^{-4}}{8.31 \times 500}; \quad 1$$

$$= 3.61 \times 10^{-3}; \quad 1$$

(If pressure not converted to Pa, max 2)

(If $n = \frac{RT}{pV}$ used = CE; M2 = M3 = 0)

(ii) moles $\text{NO}_2 = \frac{4}{5} \times 3.61 \times 10^{-3}; \quad 1$

[mark is for use of 4/5]

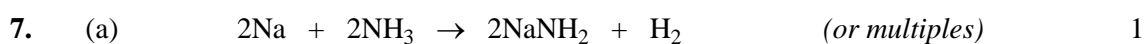
$$= 2.89 \times 10^{-3} \text{ OR } 1.78 \times 10^{-3}; \quad 1$$

$M_r \text{ NO}_2 = 46; \quad 1$

mass $\text{NO}_2 = 46 \times 2.89 \times 10^{-3} = 0.133 \text{ (g) OR } 0.0821 \text{ (g);} \quad 1$

(if atomic numbers used, M3 = M4 = 0)

[11]



(b) (i) Simplest ratio of atoms of each element in a compound / substance / species / entity / molecule 1

	Mg	N	O	
(ii)	$\frac{16.2}{(24)}$	$\frac{16.2}{24.3}$	$\frac{18.9}{14}$	$\frac{64.9}{16}$
	(0.675)	0.667	1.37	4.06
	1	2	6	MgN ₂ O ₆

(Mark M1 first. If any wrong A_r used = CE = 0)

(Accept Mg(NO₃)₂ for M3 if above working shown)

[4]

8. (a) (i) $100 \times 10^{-3} \times 0.500 = 5.00 \times 10^{-2}$ (mol) accept $5 \times 10^{-2} / 0.05$ 1

(ii) $27.3 \times 10^{-3} \times 0.600 = 1.64 \times 10^{-2} / 1.638 \times 10^{-2}$ (mol) only 1

(iii) 1.64×10^{-2} (mol) 1
Mark conseq on (ii)

(iv) $5.00 \times 10^{-2} - 1.64 \times 10^{-2} = 3.36 \times 10^{-2}$ (mol) 1
Mark conseq on (i) & (iii)

(v) $3.36 \times 10^{-2} \times \frac{1}{2} = 1.68 \times 10^{-2}$ (mol) If 2.78×10^{-2} used 1.39×10^{-2} 1
Mark conseq on (iv)

$1.68 \times 10^{-2} \times 132(1)$ or $1.39 \times 10^{-2} \times 132(1)$ 1
Mark for M_r

= 2.22 g or 1.83 g 1

(b) $pV = nRT$ 1

$n = \frac{0.143}{17} = 8.4(1) \times 10^{-3}$ (mol) 1

$T = \frac{pV}{nR} = \frac{100000 \times 2.86 \times 10^{-4}}{8.31 \times 8.4 \times 10^{-3}}$ (1) 1

= 408.5 – 410.5 (K) 1

Mark conseq on moles

Note Sig. fig. penalty - apply once if single sf given, unless calc works exactly

[11]

9. Ideal gas equation: $pV = nRT$ (1)

$$\text{Calculation: } n = pV/RT = \frac{103000 \times 127 \times 10^{-6}}{(8.31 \times 415)} \quad (1)$$

mark for volume conversion fully correct

$$= 3.79 \times 10^{-3} \text{ (mol)} \quad (1)$$

range 3.79×10^{-3} to 3.8×10^{-3}

$$M_r = m/n = .304/3.79 \times 10^{-3} = 80.1 \quad (1)$$

range 80 – 80.3

min 2 s.f. conseq

If 'V' wrong lose M2; 'p' wrong lose M3; 'inverted' lose M3 and M4

5

[5]

10. (a) M1 % by mass of H = 7.7(0)% (1)

$$M2 \quad \text{mol H} = 7.70 / 1 = 7.70$$

$$\text{mol C} = 92.3 / 12 = 7.69 \quad (1)$$

M3 (ratio 1:1 \therefore) CH

$$\text{Credit variations for M2 } 78 \times \frac{77}{100} = 6 \text{ and } \frac{78}{12} \times \frac{92.3}{100} = 6$$

Correct answer = 3 marks

(b) (CH has empirical mass of 13 and $\frac{78}{13} = 6 \therefore$) C_6H_6

Correct answer 1 mark

4

[4]

11. $23/6.023 \times 10^{23}$ (1)

CE = 0 if inverted or multiplied

tied to M1 $3.8(2) \times 10^{-23}$ [2-5 sig figs] (1)

2

[2]

12. (a) (simplest) ratio of atoms of each element in compound (1)

(b) % oxygen = 39.5% (1)

$$\text{Na } 28.4/23$$

$$= 1.23$$

$$\text{Cr } 32.1/52$$

$$= 0.617$$

$$\text{O } 39.5/16 \quad (1)$$

$$= 2.47$$

(2:1:4) so empirical formula = Na_2CrO_4 (1)4

If % oxygen not calculated, only M2 available; if A_r values wrong, only M1 available

[4]

13. (a) 0.240 (1)
 Mr (TiCl₄) = 190 (1)
 $\text{moles TiCl}_4 = \frac{0.24}{4} = 0.06$ (1)
 mass = 0.06 × 190 = 11.4 (1) 4

(b) moles NaOH = moles HCl = 0.12 (1)
 vol NaOH = $\frac{\text{moles}}{\text{conc}}$ (1)
 $= \frac{0.12}{1.1} = 109\text{cm}^3$ (1) 3

(c) moles H₂ = $\frac{\text{moles HCl}}{2} = 0.06$ (1)
 (allow conseq)
 $V = \frac{nRT}{p}$ (1) or $PV = nRT$
 $= \frac{0.06 \times 8.31 \times 293}{98000}$ (1)
 $= 1.49 \times 10^{-3} \text{ m}^3$ (1) etc
 (if chemical error on moles H₂, max2) (2) 4

[11]

14. (a) moles of S = $\frac{10.0}{32.1}$ (= 0.3125) allow $\frac{10}{32}$ (1)
 mass of sodium sulphide 0.312 × 78.1 i.e. 24.4 g or 24.37 g
 (accept 24.3 g or 24.33 g) (no sig.fig. penalty) (ignore units) (1) 2

(b) moles of hydrogen sulphide $\frac{5.00}{34.1}$ (i.e. 0.1466 or 0.147 mol) (1)
 moles of hydrogen gas needed = moles of H₂S (1)
 volume: 0.1466 × 24500 i.e. 3592 or 3590 cm³
 (3602 or 3600 if 0.147 used) (1) 3

answer must be in cm³ ie × 24500, not × 24.5 / no s.f.
 penalty / ignore units

allow $PV = nRT$ method with remembered value of R

[5]

15. (a) Ideal gas equation law (1) 1

(b) Moles of X: $n = \frac{PV}{RT}$ (1) = $\frac{110000 \times 2.34 \times 10^{-4}}{8.31 \times 473}$
= 6.55×10^{-3} (1)

6.5 to 6.6×10^{-3} , min 2 sig figs

If write $n = \frac{RT}{PV}$ zero here, but can score M_r

Relative molecular mass of X: $M_r = \frac{m}{n}$ (1)
= 62 (1)

61.5 to 62.5

4

(c) % oxygen = 51.6 (2)

C = $38.7 / 12$ H = $9.68 / 1$ O = $57.6(2) / 16$ (1)
= 3.23 = 9.68 = 3.23

1 : 3 : 1 ∴ CH₃O (1)

If no % O or if wrong A_r used then max 1

Correct empirical formula earns all three marks

3

(d) $(\frac{62}{31} \times \text{CH}_3\text{O}) = \text{C}_2\text{H}_6\text{O}_2$ (1) 1

[9]

16. (a) Moles HCl = $\frac{\text{mass}}{M_r} = \frac{19.6}{36.5}$ (1) (= 0.537)

Concentration = $\frac{0.537}{0.25}$ (1)
= 2.15 (mol dm⁻³) (1)

Conseq on $\frac{\text{mass}}{M_r}$ correct

min 2 d.p. 2.14 to 2.15

Ignore units

A.E. lose one mark

3

(b) (i) $\frac{21.7}{1000} \times 0.263 = 5.7(1) \times 10^{-3} \text{ (mol) (1)}$
5.7 to 5.71 $\times 10^{-3}$

(ii) $\frac{5.71 \times 10^{-3}}{2} = 2.85 \times 10^{-3} \text{ (mol) (1)}$
Conseq

(iii) $\frac{0.394}{2.85 \times 10^{-3}} = 138 \text{ (1)}$
Conseq

(iv) *Relative atomic mass of M:* $138 - 60 = 78 \text{ (1)}$
 $\frac{78}{2} = 39 \text{ (1)}$

Identify of M: Potassium or K or K^+ (1)

Conseq

If 78 = M_r then M = selenium

6

[9]

17. (a) $L = \frac{1.0078}{1.6734 \times 10^{-24}} \text{ (1) or } \frac{\text{mass of 1 mol}}{\text{mass of 1 atom}}$
must show working

$= 6.0225 \times 10^{23} \text{ (1)}$

Ignore wrong units

NB answer only scores 1

2

(b) equal (1)
Or same or 1:1

1

(c) $PV = nRT \text{ (or } n = \frac{PV}{RT} \text{) (1)}$

$= \frac{98000 \times 0.0352}{8.31 \times 298} \text{ (1)}$

$= 1.39 \text{ (1)}$

Allow 1.390 to 1.395

ignore units even if incorrect

answer = 1.4 loses last mark

3

(d) $0.732 \times \frac{1000}{250} = 2.93$ (1) mol.dm⁻³ (1)

OR M, mol/dm³, mol.l⁻¹

allow 2.928 to 2.93

Note unit mark tied to current answer but allow unit mark if answer = 2.9 or 3

2

(e) (i) moles H₂SO₄ = $\frac{25}{1000} \times 1.24 = 0.0310$

If use m₁v₁ = m₂v₂ scores 3 if answer is correct otherwise zero

moles NH₃ in 30.8 cm³ = $0.0310 \times 2 = 0.0620$ (1)

Mark is for x2

CE if x 2 not used

moles of NH₃ in 1 dm³ = $0.620 \times \frac{1000}{30.8} = 2.01$ (1) (mol dm⁻³)

Allow 2.010 to 2.015

No units OK, wrong units lose last mark

(ii) moles (NH₄)SO₄ = moles H₂SO₄ = 0.310 (1)

Allow consequential wrong moles in part (i) if clear H₂SO₄=(NH₄)SO₄

Wrong formula for (NH₄)SO₄ CE=0

M_r (NH₄)SO₄ = 132.1 (1)

Allow (132)

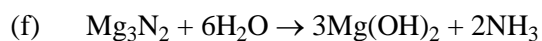
mass = moles × M_r = $0.0310 \times 132.1 = 4.10$ (1)

if moles of (NH₄)SO₄ not clear CE

(g) wrong unit loses mark

Allow 4.09 – 4.1 – 4.11

6



Formulae (1)

Balanced equation (1)

2

[16]

18. (a) $\frac{\text{average mass of an entity (1)}}{\text{mass of 1 atom of } ^{12}\text{C}} \times 12 \text{ (1)}$ 2

(b) simplest ratio of atoms of each element in a compound 1

(c) (i) %O = 65.7 (1)

$$\begin{aligned} \text{C:H:O} &= \frac{32.9}{12} : \frac{1.40}{1} : \frac{65.7}{16} \text{ (1)} \\ &= 1.96 : 1 : 2.93 \\ &= \text{C}_2\text{HO}_3 \text{ (1)} \end{aligned}$$

(ii) $\text{C}_4\text{H}_2\text{O}_6 \text{ (1)}$ 4

(d) (i) $\frac{\text{mass}}{M_r} = \frac{1000}{16} = 62.5 \text{ (1)}$
(1)

0.0625 scores one

(ii) $pV = nRT \text{ (1)}$

$$\begin{aligned} &\text{(1)} \\ V &= \frac{nRT}{P} = \frac{2 \times 62.5 \times 8.31 \times 298}{100000} \text{ (1)} \\ &= 3.10 \text{ m}^3 \text{ (1)} \end{aligned}$$

(allow consequential marking but if factor of 2 in missing max = 2) 6

[13]

19. Avogadro's number of molecules (1)

allow 6 to 6.1×10^{23} molecules OR No. of atoms in 12g of ^{12}C 1

[1]

20. (a) Avogadro's 1

(b) (i) $pV = nRT \text{ (1)}$

allow $\{V = \frac{nRT}{P} \text{ etc., } pV = \frac{m}{M_r} RT$

(ii) $V = \frac{nRT}{P}$
 $= \frac{1 \times 8.31 \times 298}{100000} \text{ (1)}$

$= 0.0248 \text{ m}^3 \text{ (1)}$

(allow 0.0247 to 0.025)

allow use of 100 for P if ans given as 24.8 dm^3

$$(iii) \quad n = \frac{pV}{RT} = \frac{500000 \times 0.005}{8.31 \times 273} \quad (1)$$

(treat 500 as AE-1 other values 1^s 2mar

0.005/1000 loses 1st two marks

$$= 1.10 \text{ mol} \quad (1)$$

(allow 1.1 to 1.11)

$$M_r(\text{CO}_2) = 44 \quad (1)$$

treat wrong Mr as AE-1

$$\text{mass} = 44 \times 1.10 = 48.5 \text{ (g)} \quad (1)$$

(allow 48-49)

(note can use calculation involving $\frac{P_1V_1}{T}$ and 22.4 dm^3 instead of 1st mark - requires same accuracy for full marks)

7

$$(c) \quad \text{moles HCl} = \frac{100}{1000} \times 5.0 = 0.5(0) \text{ (mol)} \quad (1)$$

$$\text{moles H}_2 = \frac{\text{moles HCl}}{2} \quad (1) = 0.25 \text{ (mol)}$$

(if no factor of 2 CE = 0 from here)

$$\text{mass H}_2 = 0.25 \times 2 = 0.5(0) \text{ (g)} \quad (1)$$

3

$$(d) \quad (i) \quad \%O = 44.4 \quad (1)$$

(if incorrect %O, AE-1)

(if %O omitted can score max 1 for FeC₂)

$$\text{ratio Fe:C:O} = \frac{38.9}{55.8} : \frac{16.7}{12.0} : \frac{44.4}{16.0} \quad (\text{if use At, CE})$$

$$= 1 : 2 : 4$$



$$(ii) \quad \text{CO} \quad (1)$$

(mark independent of d (ii))

4

[15]

$$21. \quad (a) \quad \text{moles of NH}_3 = \frac{20.0}{17.0} \quad (1)$$

$$\text{moles of HNO}_3 = \text{moles of NH}_3 = 1.18$$

$$\text{volume} = \frac{1.18}{2} \quad (1)$$

$$= 0.588 \text{ (1) dm}^3 \text{ (1)}$$

4

- (b) (i) $PV = nRT$ (1)
- $$n = \frac{PV}{RT} = \frac{95000 \times 0.0500}{8.31 \times 298} \text{ (1)}$$
- $$= 1.92 \text{ mol (1)}$$
- (ii) Moles of ammonium nitrate $\frac{1.92}{1.5}$ (1) 1.28 mol
- Mass of ammonium nitrate mass = 1.28×80 (1) = 102 g (1) 6

[10]

22. $\frac{12}{1.99 \times 10^{-23} [[1]]} = 6.03 \times 10^{23}$ (1) 2

[2]

23. (a) mass ratio of $O_2:KClO_3 = 96 / 245.2$ (= 0.392)
or moles of $O_2 = 3/2 \times 1.20 \times 10^{-2}$ or equivalent (1)
 mass of $O_2 = 0.392 \times 1.47 = 0.576$ g (1) 2
- (b) moles $O_2 = 1.00/24.00$ (= 0.0417 mol) (1)
 moles $KClO_3 = 2/3$ moles $O_2 = 0.0417 \times 2/3 = (0.0278 \text{ mol})$ (1)
 mass $KClO_3 = 0.0278 \times 122.6 = 3.41$ g (1) 3
- give one mark for $pV = nRT$ to get n for O_2 ,
 then second and third mark as above
- or** $2/3$ mole of $KClO_3 \rightarrow 1$ Mole of O_2 (1)
 81.7 g $\rightarrow 24 \text{ dm}^3 O_2$ (1)
 $\frac{81.7}{24}$ g = 3.41 g $\rightarrow 1 \text{ dm}^3 O_2$ (1)
- penalise other than 2 – 5 sig. figs. once in (d)(i) and (ii)
 penalise missing or wrong units once in (d)(i) and (ii)

[5]

24. (a) Mass of each element in the compound (1) 1
- (b) Number of atoms of each element in a molecule (1) 1
- (c) (i) Mr $Ba(NO_3)_2 = 261$ (1)
 moles $Ba(NO_3)_2 = \frac{5}{261}$ (1) = 0.0192
 moles gas = $2 \frac{1}{2} \times 0.0192$ (1) = 0.0479
 $V = \frac{nRT}{p}$ (1) = $\frac{0.0479 \times 8.31 \times 298}{100000}$
 $= 1.19 \times 10^{-3} \text{ m}^3$ (1)
- (ii) moles HCl = 2×0.0192 (1) = 0.0384
 vol HCl = $\frac{0.0384}{1.2} = 0.032 \text{ dm}^3$ (1) (or 32 cm^3) 7

[9]

25.

percentage by mass of oxygen = 38.0% (1)
ratio of elements = 42.9/12 : 2.4/1 : 16.7/14 : 38.0/16 (1)
= 3.6 : 2.4 : 1.2 : 2.4
empirical formula is C₃H₂NO₂ (1)
molecular formula is C₆H₄N₂O₄ (1)

4

[4]

26.

(a) %H = 18.8 (1)
B : H = $\frac{81.2}{10.8} : \frac{18.8}{1}$ (1)
= 2 : 5 : B₂H₅ (1)

(b) B₄H₁₀ (1)

4

[4]

27. (a) $\frac{\text{mean mass of an entity (or molecule)}}{\text{mass of 1 atom of } ^{12}\text{C}} \times 12$ (1)

2

(b) $\frac{12}{1.993 \times 10^{-23}} = 6.02 \times 10^{23}$ (1)

(allow 6.020 to 6.023)

1

[3]

28.

(b) (i) %F = 42.8 (1)

I:F = $\frac{57 \cdot 2}{127} = \frac{42 \cdot 8}{19}$ (1)

= IF₅ (1)

(ii) I₂ + 5F₂ → 2IF₅ (1) (or × ½)

4

[4]

29. C $22.24/12 = 1.85$ H $3.71/1 = 3.71$ Br $74.05/79.9 = 0.927$ (1)
ratio C:H:Br = 2:4:1 \therefore C₂H₄Br (1)
empirical mass = 107.9 \therefore mol formula = $215.8/107.9 \times \text{C}_2\text{H}_4\text{Br} = \text{C}_4\text{H}_8\text{Br}_2$ (1)
must use % to justify answer

or

- C $(22.24/100) \times 215.8 = 47.99$ i.e. $48/12 = 4$ carbon atoms (1)
H $(3.71/100) \times 215.8 = 8.01$ i.e. $8/1 = 8$ hydrogen atoms (1)
Br $(74.05/100) \times 215.8 = 159.8$ i.e. $159.8/79.9 = 2$ bromine atoms (1)

or

- C $(48/215.8) \times 100 = 22.24\%$ (1)
H $(8/215.8) \times 100 = 3.71\%$ (1)
Br $(159.8/215.8) \times 100 = 74.05\%$ (1)

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[3]