Name of the Student:_____
Max. Marks : 24 Marks **Time : 24 Minutes**

Mark Schemes

Q1.

M1 $\frac{2.62\times10^{-3}}{6.56\times10^{-4}} = 4$ or $\frac{6.56\times10^{-4}}{2.62\times10^{-3}} = 0.25$

M2 Hence $4CO_2 + 4H_2O$

M3 So 4C and 8H in L

M4 Hence 2O so $C_4H_8O_2$

$C_3H_4O_3$ scores 1 if no other mark scored

Alternative method

M1
nH in L = 5.24×10^{-3}
Hence mass H = 5.24×10^{-3} g

M2
n C in L = 2.62×10^{-3}
Hence mass C = $2.62 \times 10^{-3} \times 12$
= 3.144×10^{-2} g

M3
Mass L = $6.56 \times 10^{-4} \times 88$
= 0.057728 g
Mass O = 0.057728 - ($5.24 \times 10^{-3} + 3.144 \times 10^{-2}$)
= 0.021048 g

M4
nO = 0.021048 / 16
= 1.3155×10^{-3}

EF	C	H	O
	2.62×10^{-3}	5.24×10^{-3}	1.3155×10^{-3}
	2	4	1

MF = (88/44) x C_2H_4O
= $C_4H_8O_2$

$C_3H_4O_3$ scores 1 if no other mark scored

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Q2.

(a) $\frac{0.100 \times 250 \times 171.3}{1000}$ = 4.28 g

Allow 4.3 g

1

(b) M1 Transfers the solution to a volumetric/graduated flask

M2 Add washings using distilled water and make up to the graduation mark/250 cm^3

M3 Invert many times / shake to mix

3

(c) So that the titration is done with known concentration of $Ba(OH)_2$

Allow so that water does not dilute the solution

Allow remove water/prevent contamination

1

(d) Drops of acid could fall into the burette (so no longer know how much has been added from burette)

OR

Decreases titre

Ignore changes the titre

Do not accept increases titre

1

(e) **M1** n $Ba(OH)_2$ in 25 cm^3 = $\frac{0.952}{171.3 \times 10}$ = 5.56 x 10^{-4} mol

M2 n HCl in 24.5 cm^3 = **2 x** 5.56 x 10^{-4} = 0.00111 mol

M2 = M1 x 2

M3 Concentration of HCl = $\frac{0.00111 \times 1000}{24.50}$ = 0.045 mol dm^{-3}

M3 = $\frac{M2 \times 1000}{24.50}$

3

(f) $\left(\frac{0.15}{24.50} + \frac{0.05}{25.00}\right)$ x 100% = 0.8(1)%

1

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Q3.

(a) M1 n(propanone) = $\frac{0.146}{58}$ (= 2.52×10^{-3})

M2 Conversion of T and P (T = 368K and P = 103000Pa)

M3 V = $\frac{nRT}{P}$ rearranged for V as subject (in algebraic or numbers)

V = $\frac{M1 \times 8.31 \times 368}{103000}$ *scores M2 and M3*

M4 their evaluated M3 × 1 × 10^6 = 75 cm^3

Allow 74-75

4

(b) M1 V = $\frac{348}{368}$ × M4 = 71 cm^3

Marked with (a)

Using alternate answer

M1 V = $\frac{348}{368}$ × *89 = 84* cm^3

M2 Decrease = M4 - M1 = 4 cm^3

M2 89 - 84 = 5 cm^3

Allow answer for M1 calculated as 70.8 cm^3 *after substitution of values into pV = nRT. Could then lead to a difference of 18.2* cm^3 *if compared to the alternate value for M4 of 89* cm^3

2

(c) M1 % uncertainty = $\frac{0.001}{0.146}$ × 100 = 0.685%

Marked with (a)

M2 Vol uncertainty = $\frac{M1}{100}$ × M4 = 0.5 cm^3

Allow 0.6 cm^3 *if 89* cm^3 *used*

2

(d) M1 Vol CO_2 formed = 3 × 600 = 1800 cm^3

If PV = nRT method used

M1 n(CO_2*) = 0.0651*

M2 Total Vol left = 1800 + 400 = 2200 cm^3

2

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