Question Number	Answer	Acceptable answers	Mark
1(a)	$CaCl_2$ = 40 + 35.5 + 35.5 (=111) (1) THEN moles = 11.1 / 111 (= 0.1) (1) conc = **<u>moles</u>** x 1000/500 (=0.2) (1) OR mass conc = 11.1 x 1000/500 (=22.2) (1) conc = **<u>mass conc</u>**/111 (= 0.2) (1)	<u>0.2 scores 3</u> ecf: 11.1 / Mr ecf: mass conc / 111	**(3)**

Question Number	Answer	Acceptable answers	Mark
1(b)(i)	A description linking • **<u>pipette</u>** (1) • one practical point eg draw liquid <u>up to line</u>/ use pipette filler/ rinse first / read at eye level (1)	**ignore** burette etc for 1st mpt if using measuring cylinder/ burette allow suitable practical point eg read at eye level/ add dropwise from burette near 25 cm^3 (1) ignore as 2nd point: transfer liquid to flask / safety precautions	**(2)**

Question Number	Answer	Acceptable answers	Mark
1(b)(ii)	**D** 25.20 cm^3		**(1)**

Question Number		Indicative Content	Mark
QWC	***1(c)**	A description / explanation including some of the following points **soft** • add soap (solution) • shake/ mix • lather (immediately) • no scum/ no precipitate **permanent hard** • add soap (solution) • shake • no lather / less than with soft water • scum/ precipitate • boiled sample • same results / boiling does not change • becomes soft after ion exchange but not after boiling **temporary hard** • add soap (solution) • shake • no lather / less than with soft water • scum/ precipitate • **boiled** sample • after boiling precipitate / (lime)scale formed • lather (immediately) credit quantitative approaches e.g. titration with soap solution	**(6)**

Level	**0**	No rewardable content
1	**1 - 2**	• a limited description e.g. test and one result / when shaken with soap, soft water makes lather but no scum • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy
2	**3 - 4**	• a simple description e.g. describe test and results to distinguish the soft water and the two samples that are hard water / when shaken with a small amount of soap, soft water makes a lather and no scum but the other waters make scum but no (less) lather • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy
3	**5 - 6**	• a detailed description e.g. describe test and results to identify all three of the samples / as 3-4 and boil the two hard water samples and repeat test. That which now gives a lather is temporarily hard • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors