Question	Answer	Marks	Part Marks and Guidance	
1	Circle centre R radius 3 cm	1	Or arc of this circle extending through at least 3 of the six circles for this arc on the overlay Condone arc hand-drawn only if in tolerance for three consecutive circles on overlay	Use overlay; tolerances 2 mm; if in doubt, use ruler For all boundaries, allow marks whether they are dashed or full
	Ruled line parallel to AB and 3 cm from it	1	Extending through at least 2 of the three circles for this line on the overlay	
	Perpendicular bisector of TW attempted	M1	**M0** for arcs/circles centres T and W with no line	Allow **M1** for line through midpoint of TW but at 80 to 100° to TW eg **M0** for line through centre of TW parallel to wall of house
	Accurately drawn bisector with correct compass arcs	A1	Line must extend at least between the circles on the overlay	Allow **A1** for touching circles and common tangent drawn if accurate
	Correct region shaded	1	Dependent on circle and two lines attempted for the above loci	Region must be bounded by the house wall, another two lines and the arc for the distance from R; ignore any shaded/non-shaded region to left of circle if FT from wrong bisector

2	(a)		Correct front elevation <u>with or without</u> join lines or other interior lines	2	**M1** for 9cm by 1cm rectangle seen or for a 3cm by 1cm rectangle seen	Condone freehand
			Correct plan <u>including</u> two hidden edges only	2	**M1** for 9cm by 3.5cm rectangle seen *For reversed answers, mark as scheme and then −1*	Allow 3.5 ± 0.2 cm Hidden edges dotted or solid
	(b)		52 500 or 0.0525	3	isw after a correct answer if attempt to convert to other units **M2** for complete correct method Or **M1** for correct method for one relevant volume Or **SC2** for answer 52.5 from using measurements from part (a)	*Accept lengths in metres, consistent and correct* <u>eg</u> **M2** for 90 × 35 × 10 + 30 × 35 × 10 × 2 Or **M1** for 90 × 35 × 10 (31500) or 30 × 35 × 10 [×2] (10500, 21000) <u>OR</u> **M2** for 90 × 40 × 35 – 70 × 30 × 35 Or **M1** for 90 × 40 × 35 (126000) or 70 × 30 × 35 (73500) etc
			cm^3 or m^3 or in words or in words	1	Independent	
	(c)		UB = 75.5 LB = 74.5	1 1	Condone 75.5[0] or 75.49[9..] Condone 74.5[0] After **0** scored allow: **SC1** for one correct value in wrong position	

3	(a) ♠		Arcs drawn with radii 9.5 and 4.8 cm centres A and C resp.	1	Tolerance 2mm	the arcs should be inside circles on overlay but condone outside and very nearly touching circles when screen is set to width; one of the arcs should extend through at least three circles, including D NB spurious arcs put in afterwards do not gain credit; ignore other arcs on the diagram
			Quadrilateral completed with ruled lines, with D in tolerance	1	[This mark available even if no arcs seen] condone dashed lines, if 0, allow **SC1** for one correct arc	condone wrong / no label for D; tolerance – the vertex should be inside circle on overlay but condone outside and very nearly touching circle when screen is set to width allow SC1 for quadrilateral completed, with arcs, using CD = 9.5 cm and AD = 4.8 cm
	(b) ♠		Correct construction arcs	1	Check by eye; use marking tool if in doubt	NB spurious arcs put in afterwards do not gain credit; ignore other arcs on the diagram
			Correct ruled bisector drawn	1	Within tolerance on overlay	to extend at least to the circles on overlay, going through or touching these

4	(a)		(3, 6.5) oe	2	**1** each; accept 13/2 oe isw	
	(b)		9.8 or 9.84 to 9.85	4	NB **0** for scale drawing **M1** for 4 and 9 seen or used on diagram or in this part; **M1** for *Their* $4^2 + 9^2$ **M1** for $\sqrt{Their\,9^2 \pm their\,4^2}$ **A1** for 9.8 or 9.84 to 9.85	Allow **M1** for $a^2 + b^2$ attempted with any numbers ft their numbers used

5			Angle 77° correct	1	Tolerance ± 2°	
			12.2 cm drawn accurately, FT *their* angle	1	Tolerance ± 2 mm	
			Remaining vertex in correct position FT, with compass arcs drawn correctly	2	**B1FT** if no compass arcs Or **M1FT** if correct arcs with error in one of the lengths If they ignore line given and start again, mark accordingly, but for the first mark their line must be 8.5 to 8.9 cm	Use deviation of top left hand vertex from ideal, if in tolerance, to help judge acceptable position for final vertex If in doubt of tolerance, check with the protractor and/or ruler instead of the multi-line overlay

6	(a)		Correct angle for bearing used; tol 2°	1	Accept line or evidence such as dot in correct direction from A	Use overlay; if in doubt, use protractor or ruler (accept obtuse angle NAC from 111-115 inclusive)
			Mark for C 7.2 cm from A, tol 2 mm	1	Or other evidence eg line from A 7.2 cm long	If just a dot, need to be convinced it is not just a fleck from scanning – may be implied by use in (b) If C not marked, allow 2nd mark for an arc centre A rad 7.2 cm drawn; tol 2 mm
	(b)		235 (accept 220 – 250 inclusive) FT	2FT	**FT** (5 × *their* BC in mm) calculated, tolerance 15 **B1** for answer up to and including 5 below or above acceptable range FT Or **M1** for 4.7 [cm] or 47 [mm] or FT *their* BC, tol. 3 mm	Use ruler with one end set on B eg for C correctly 4.7 cm from B, allow **B1** for 215 to 255 if B2 not earned eg allow **M1** for answer of 4.7 on answer line

7			Correct line	1	Within tolerance 88 to 92° of AB and within 1mm of P; line to reach at least from P to within 2mm of AB	Set up the protractor tool with one arm along AB and the other going through P, set at 90
			Arcs showing compasses used correctly	1	As well as standard two pairs of two arcs, condone arc touching line drawn and radius drawn, condone 'kite construction'	'Kite construction' arcs through P centre A above and below AB intersecting with similar arcs centre B Also condone 'half kite' with just the intersecting arcs below AB but with radii AP and BP Ignore perp bisector if also drawn NB **0** for spurious arcs drawn after the line – watch for these

8		Correct line through A on bearing of 128°	**1**	Tolerance 2°	Use overlay – allow provided their line does not cross red lines (allow touching lines) – if just out then check with protractor
		Perp. bisector of AB drawn with correct intersecting arcs (must be at least 2 cm long)	**2**	Line must be accurate between the green lines and as far as the blue lines (it can be shorter) isw sections after that **M1** if accurate part of perp bisector (at least 2 cm long) but no arcs or contrived arcs	Allow one pair of arcs shown for perp bisector (not for just touching arcs) Use overlay
		Distance = 1.9 to 2.1 km	2FT	Correct or FT ± 0.1 km **Dep** on at least 1 mark earned previously for distance from intersection or clear point marked to L If the point is not clearly indicated then no marks available e. several points marked with no line to L several points marked all joined to L or the end of a line with no clear indication that this is being used **or B1** for distance in cm ± 0.2 cm (or mm) e.g. 3.8 to 4.2 cm If 0 scored then **SC2** for FT distance in km from L to a clearly marked point that must lie between the red lines **or** the green lines (when extended if necessary) or **SC1** for FT dist in cm as above If no lines shown and only one point between the red lines **or** the green lines then allow **SC2** or **SC1**	Accept written on diagram if answer space is empty Allow **2** marks for answer in range 1.9 – 2.1 km without measuring if 1 mark already scored Accept 1900 **m** to 2100 **m** for **2** marks **cm** must be written for **B1**

9			Correct perpendicular line	1	Within tolerance 88 to 92° of AB and within 1mm of D; line to reach at least from D to within 2mm of AB	
			Arcs showing compasses used correctly	1	As well as standard two pairs of two arcs, condone arc touching line drawn and radius drawn, condone 'kite construction'	'Kite construction' arcs through D, centre A, above and below AB intersecting with similar arcs centre B Also condone 'half kite' with just the intersecting arcs below AB but with radii AD and BD Ignore perp. bisector if also drawn NB **0** for spurious arcs drawn after the line – watch for these
			14.8 to 15.2	2	**M1** for 7.4 to 7.6 [cm] or 1480 to 1520 [cm]	