

Q1.

Question number	Answer	Additional guidance	Mark
	substitution (1) $100 \div 13$ answer (1) $7.7 \text{ (g/cm}^3\text{)}$	award full marks for correct numerical answer without working allow $7.692 \text{ (g/cm}^3\text{)}$	(2)



Q2.

Question number	Answer	Additional guidance	Mark
	<p>calculation of change in volume (1) $(530 \text{ cm}^3 - 490 \text{ cm}^3) = 40 \text{ (cm}^3\text{)}$</p> <p>substitution (1) $7.9 = \frac{\text{mass}}{40}$</p> <p>rearrangement and evaluation (1) (mass = 7.9×40) (mass =) 316 (g)</p> <p>evaluation to 2 sig fig (1) 320 (g)</p>	<p>measurement mark – using scale</p> <p>allow use of incorrect volume</p> <p>answers without working</p> <p>316 scores 3 marks</p> <p>0.316 kg scores 3 marks</p> <p>316 to any other power of 10 scores 2 marks</p> <p>4187 or 3871 scores 2 marks (incorrect volume)</p> <p>any answer written to 2sf independent mark</p> <p>answers without working</p> <p>320 scores 4 marks</p> <p>320 to any other power of ten scores 3 marks</p> <p>4200 scores 3 marks</p> <p>3900 scores 3 marks</p>	<p>(4)</p> <p>AO2</p>

Q3.

Question	Answer	Additional guidance	Mark
	<p>substitution (1)</p> $8.96 = \frac{14.1}{V}$ <p>rearrangement (1)</p> $(V =) \frac{14.1}{8.96}$ <p>evaluation (1)</p> $(V =) 1.57 \text{ (cm}^3\text{)}$	<p>allow substitution and rearrangement in either order</p> <p>allow substitution of correct values into a visible, incorrectly rearranged algebraic equation for this mark only</p> $(V =) \frac{m}{\rho}$ <p>accept numbers that round to 1.57 allow 1.6</p>	<p>(3) AO2.1</p>
		<p>award full marks for the correct answer without working</p> <p>allow 1.6 or answers rounding to 1.57 to any other power of 10 scores 2 marks</p>	

Q4.

Question number	Answer	Additional guidance	Mark
(i)	Substitution: Density = mass/ volume (1) = $28 \times 10^{-3} / 3.6 \times 10^{-6}$ (1) Evaluation = 7777 kg / m^3 (1)	(recalled / used) ignore any power of ten (pot) error here do not penalise any sf errors (7.77 etc. would get 2 marks: losing the pot mark in the evaluation)	(3)

Q5.

Question number	Answer	Additional guidance	Mark
(ii)	recall and substitution (1) density = $\frac{m}{V}$ (density =) $\frac{0.058}{6.5 (\times 10^{-6})}$ evaluation (1) $8.9 \times 10^3 \text{ (kg/m}^3\text{)}$	accept values that round to 8900 e.g. 8923(kg/m ³) or 9000 8.9 to any other power of ten gains 1 mark award full marks for correct answer without working.	(2)

Q6.

Question number	Answer	Additional guidance	Mark
	substitution (1) $(r) = \frac{7.22(\times 10^{-2})}{2.69(\times 10^{-5})}$ evaluation (1) (p =) 2680	2.68 to any power of ten seen allow any value that rounds to 2680; e.g. 2684 accept 2700 allow values in standard form e.g. 2.68×10^3	(3) A02

	unit (1) kg / m ³	kg m ⁻³ allow for three marks: 2.68 to any power of ten with a consistent unit, e.g. 2680 kg/m ³ 2680 g/dm ³ 2.68 g/cm ³ 2.68 kg/dm ³ 0.00268 kg/cm ³ 2 680 000 g/m ³ allow for two marks: <ul style="list-style-type: none">• 2680 with no or incorrect unit• 2.68 to any other power of 10 with an inconsistent unit of density• correct substitution with an inconsistent unit of density allow for one mark: <ul style="list-style-type: none">• 2680 to any other power of ten with no or incorrect unit• appropriate unit of density with no or an incorrect value	
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Q7.

Question Number:	Answer	Additional guidance	Mark
	recall and substitution (1) $(\text{density } \rho) = \frac{380}{410}$ evaluation (1) $0.93 \text{ (g/cm}^3\text{)}$	allow substitution of a mass / a volume accept any value that rounds to 0.9 allow truncated 0.92 (g/cm ³) only accept 1(g/cm ³) if working shown. award full marks for correct answer without working	(2) AO 2 1

Q8.

Question number	Answer	Additional guidance	Mark
	<p>volume substitution (1) $1.5 \times 1.0 \times 0.2(0) (= 0.3)$</p> <p>substitution in equation (1) $\text{mass} = 2100 \times (0.3(0))$</p> <p>evaluation (1) $= 630 \text{ (kg)}$</p>	<p>ecf from calculated value of volume for this mark only</p> <p>award 2 marks for $6.3 \times$ any other power of 10</p> <p>5670 gains 1 mark from use of $1.5+1.0+0.2=2.7$</p> <p>award full marks for correct answer without working</p>	<p>(3) AO2</p>