

Name of the Student: _____

Max. Marks : 21 Marks

Time : 21 Minutes

Mark Schemes

Q1.

Question number	Answer	Additional guidance	Mark
(i)	<p>an explanation linking any three of the following :</p> <p>use a measuring cylinder / beaker or use a eureka can /displacement can/container with spout (1)</p> <p>(partly) fill measuring cylinder / beaker (with water) note the reading or fill (eureka) can to spout (1)</p> <p>immerse piece of copper (in water) (1)</p> <p>note difference in readings of water level (in measuring cylinder / beaker) or collect water from spout in a measuring cylinder / beaker (1)</p>	<p>give credit for other acceptable methods</p> <p>If no other marks scored then allow 1 mark for attempt to measure volume directly: e.g. fill copper tube with water, tip out and measure volume or measure dimension(s) of copper tube</p>	(3)

Question number	Answer	Additional guidance	Mark
(ii)	<p>recall and substitution (1)</p> $\text{density} = \frac{m}{V}$ <p>(density =) $\frac{0.058}{6.5 \times 10^{-6}}$</p> <p>evaluation (1)</p> $8.9 \times 10^3 \text{ (kg/m}^3\text{)}$	<p>accept values that round to 8900 e.g. 8923(kg/m³) or 9000</p> <p>8.9 to any other power of ten gains 1 mark</p> <p>award full marks for correct answer without working.</p>	(2)

Q2.

Question number	Answer	Additional guidance	Mark
	<p>substitution (1)</p> $(\rho) = \frac{7.22(\times 10^{-2})}{2.69(\times 10^{-5})}$ <p>evaluation (1)</p> <p>(ρ =) 2680</p> <p>unit (1)</p> kg / m^3	<p>2.68 to any power of ten seen</p> <p>allow any value that rounds to 2680; e.g. 2684</p> <p>accept 2700</p> <p>allow values in standard form e.g. 2.68×10^3</p> <p>kg m⁻³</p> <p>allow for three marks: 2.68 to any power of ten with a consistent unit, e.g. 2680 kg/m³ 2680 g/dm³ 2.68 g/cm³ 2.68 kg/dm³ 0.00268 kg/cm³ 2 680 000 g/m³</p>	(3) AO2

		<p>allow for two marks:</p> <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 <p>allow for one mark:</p> <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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Q3.

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) mass = $2100 \times (0.3(0))$</p> <p>evaluation (1) = 630 (kg)</p>	<p>ecf from calculated value of volume for this mark only</p> <p>award 2 marks for 6.3 x 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>

Q4.

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 (g) 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 3900 scores 3 mark</p>	<p>(4) AO2.2</p>

Q5.

Question number	Answer	Additional guidance	Mark
	269 (K)	allow use of 273.14? 269.14 (K)	(1) AO2

Q6.

	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 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>	(3) AO2.1

Q7.

Question number	Answer	Additional guidance	Mark
	estimation (1) reading off scale either 1750 or 1350 seen evaluation (1) 400 (cm ³)	allow estimate in range 1300-1400 or 1700-1800 for 1 mark accept any answer between 350 and 450 (cm ³) award full marks for the correct answer without working if no other marks scored accept an answer between 350 and 450 to any other power of 10 for one mark	(2) AO2.2