

Q1. (2018)

a)

02.1	Level 3: The method would lead to the production of a valid outcome. All key steps are identified and logically sequenced.	5–6	AO1 6.3.1.1
	Level 2: The method would not necessarily lead to a valid outcome. Most steps are identified, but the method is not fully logically sequenced.	3–4	
	Level 1: The method would not lead to a valid outcome. Some relevant steps are identified, but links are not made clear.	1–2	
	No relevant content	0	
Indicative content <ul style="list-style-type: none"> • measure mass • use a top pan balance or scales • part fill a measuring cylinder with water • measure initial volume • place object in water • measure final volume • volume of object = final volume – initial volume • fill a displacement / eureka can with water • water level with spout • place object in water • collect displaced water • measuring cylinder used to determine volume of displaced water • use of: density = $\frac{\text{mass}}{\text{volume}}$ 			

b)

02.2	all y-axis values correct (minimum of 3)	allow 1 mark for two correct values	2	AO2 6.3.1.1
	all bars drawn to the correct height	allow 1 mark for two correct bars allow $\pm \frac{1}{2}$ small square	2	

c)

02.3		an answer of 80 scores 2 marks		AO3 6.3.1.1
	$\frac{(1120 - 960)}{2}$	ignore + and / or – signs	1	
	= 80 (kg/m ³)	an answer of 160 scores 1 mark	1	

Q2. (2021)

a)

04.1	zero error	allow systematic error	1	AO1 6.3.1.1 RPA17
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b)

04.2	reset the balance to zero g	allow subtract the reading shown on the balance from the reading taken	1	AO1 6.3.1.1 RPA17
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c)

04.3	resolution	this answer only	1	AO1 6.3.1.1 RPA17
d)				
04.4	place the measuring cylinder on a horizontal surface		1	AO1 6.3.1.1 RPA17
	view with eye in line with the level of the water	allow read from the bottom of the meniscus	1	
e)				
04.5	add several coins to the measuring cylinder	allow a minimum of 5 coins if a number of coins is given	1	AO3
	measure the change in the water level in the measuring cylinder		1	AO1
	divide by the number of coins added		1	AO3 6.3.1.1 RPA17

Q3. (2021)

04.6	$8.9 = \frac{3.6}{\text{area} \times 0.16}$	allow $8.9 = \frac{3.6}{\text{volume}}$	1	AO3
	$\text{area} = \frac{3.6}{8.9 \times 0.16}$	allow $\text{area} = 2.5(28\dots) \text{ (cm}^2\text{)}$	1	AO3
	$\text{density} = \frac{3.6}{2.528 \times 0.17}$	allow $\frac{3.6}{\text{their calculated area} \times 0.17}$	1	AO3
	$\text{density} = 8.37\dots \text{ (g/cm}^3\text{)}$	allow a correct calculation using their calculated area	1	AO3
	$\text{density} = 8.4 \text{ g/cm}^3$	this mark can only be scored for a correct rounding of a value of density calculated using correct equations	1	AO2 6.3.1.1 RPA17