GET BETTER AT PHYSICS · MARK SCHEME

Density & Upthrust: tiered multiple choice

Edexcel IAL Physics · Unit 1 (WPH11) · Specification points 23–24 · 5 questions · 5 marks

1 mark per correct letter | Worked reasoning for every question

How students did = from Pearson examiner reports, where available

Answer key

Q1	Q2	Q3	Q4	Q5
D	C	D	D	B

Easy

Questions 1–4

1 **D**

Archimedes' principle · Edexcel IAL June 2025 · Unit 1 · Q1

The upthrust on an object in a fluid equals the weight of fluid it displaces. The cube displaces a weight W of liquid, so the upthrust is W.

Watch out: V × ρ is the mass of liquid displaced, not the upthrust: you would need to multiply by g.

2 **C**

Density from weight and volume · Edexcel IAL June 2021 · Unit 1 · Q2

First find the mass: m = W/g = 35.0/9.81 kg. Then ρ = m/V = 35.0 ÷ (9.81 × 1.32 × 10^{-3}) kg m^{-3}.

Watch out: Density uses mass, not weight, so divide the weight by g first.

3 **D**

Side of a cube from its weight and density · Edexcel IAL January 2024 · Unit 1 · Q8

Mass = W/g and volume = x^3, so ρ = W/(g x^3). Rearranging, x^3 = W/(ρg) and x = $\sqrt[3]{(W/(\rho g))}$.

4 **D**

Comparing densities of two cubes · Edexcel IAL January 2019 · Unit 1 · Q10

Both cubes have the same mass (50.00 g). The larger cube's volume is $(1.5)^3$ = 3.375 times bigger, so its density is 1/3.375 ≈ 0.30 of the smaller cube's.

Watch out: Cube the scale factor for volume: 1.5 is the factor for length only.

Medium

Question 5

5 **B**

Force needed to fully submerge a floating sphere · Edexcel IAL June 2019 · Unit 1 · Q3

Floating half-submerged, the upthrust equals the weight: 2.5 N. Fully submerged it displaces twice as much water, so the upthrust is 5.0 N. The extra downward force needed is 5.0 − 2.5 = 2.5 N, i.e. 1 × 2.5 N.

Watch out: The upthrust doubles; the extra force is the difference, not the new upthrust.

How students did: 34% of students got this right in June 2019. The most common wrong answer was C.

End of mark scheme. Answers from Pearson's published mark schemes; explanations written for this pack. Pearson Edexcel material is © Pearson Education Ltd. More free packs and 1-to-1 tuition: **www.getbetteratphysics.co.uk**

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