3.10 Density, Pressure in Liquids and Change of State: 10-minute Pack

EDEXCEL 4PH1 · Calculator allowed · about 10 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 State the density of water used for simple comparisons at standard conditions, and give its units.

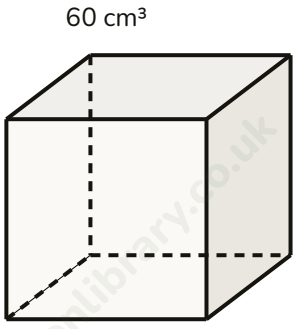
(Total for Question 1 is 1 mark)

2 Define density as it is used in the context of solids and liquids, giving the equation and naming each symbol.

(Total for Question 2 is 1 mark)

3 A small metal cube used in a school test has mass 0.48 kg and volume 60 cm^3. Calculate its density in kg/m^3.

Diagram NOT accurately drawn



(Total for Question 3 is 2 marks)

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4 An object floats on water but sinks in oil. Explain, using density ideas, what this tells you about the density of the object compared with water and oil.

(Total for Question 4 is 2 marks)

5 Explain, using particle ideas, why the temperature of a substance stays constant during melting or boiling even while energy is still being supplied. Give four distinct points.

(Total for Question 5 is 4 marks)

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Mark scheme · 3.10 Density, Pressure in Liquids and Change of State: 10-minute Pack

Question 1

1000 kg/m^3 **B1**

Answer: 1000 kg/m^3

Question 2

ρ = mass / volume, with ρ = density, mass = mass (kg) and volume = volume (m^3) or equivalent units **B1**

Answer: ρ = mass / volume, where ρ is density, mass is mass and volume is volume

Question 3

convert 60 cm^3 to m^3 = 60 x 10^{-6} m^3 or 6.0 x 10^{-5} m^3 **M1**

density = 0.48 / 6.0 x 10^{-5} = 8000 kg/m^3 cao **A1**

Answer: 8000 kg/m^3

Question 4

floats on water means object density < density of water **B1**

sinks in oil means object density > density of oil **B1**

Answer: Object density is less than water density but greater than oil density

Question 5

states that supplied energy is used to break bonds or overcome attractive forces between particles rather than increase kinetic energy **B1**

states that average kinetic energy of particles (and so temperature) stays the same while bonds are being broken **B1**

mentions change of arrangement or spacing of particles, e.g. particles move further apart when melting or boiling **B1**

links these points to latent heat, energy required per kg for the change of state **B1**

Answer: Energy goes into breaking intermolecular forces and increasing particle separation rather than raising particle kinetic energy, so temperature stays constant during the change of state; this energy per kg is the latent heat

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