Mark scheme

Question			Answer/Indicative content	Marks	Guidance
1			D	1 (AO 1.1)	
			Total	**1**	
2			D	1 (AO 2.1)	**Examiner's Comments** Many successful candidates used the 'white space' to calculate the density.
			Total	**1**	
3			C	1 (AO 1.1)	**Examiner's Comments** The correct response for this question was Option C. Option B was commonly chosen.
			Total	**1**	
4			C	1 (AO 1.1)	**Examiner's Comments** This question was generally well answered. A small minority of candidates chose either A or D. Perhaps candidates who selected D ignored the reference to nucleus in the question. **Assessment for learning** When practising answering multiple-choice questions, candidates should be encouraged to underline key terms in the question. In this case 'nucleus' and 'atom' were useful terms to highlight. Candidates should also be encouraged to consider each of the four answers and put small crosses next to answers they have 'ruled out'.
			Total	**1**	
5			**D**	1 (AO 1.1)	

			Total	**1**	
6			C	1 (AO 1.1)	
			Total	**1**	
7	a	i	Pine bar drawn to the incorrect height / pine bar drawn to 440 kg/m^3 / AW	1 (AO2.2)	
		ii	Water bar drawn to correct height of 1000 kg/m^3 ✓	1 (AO2.2)	**ALLOW** correct height drawn to ± ½ small square
		iii	Pine ✓ It has the lowest density / density is less than the density of water / less than 1000 (kg/m^3) / AW ✓	2 (1 × AO3.2b) (1 × AO2.1)	**ALLOW** oak **ALLOW** (oak) as its density is less than the density of water / less than 1000 (kg/m^3) / AW **Examiner's Comments** Most recognised that the 'pine' bar was incorrectly drawn in part (b) (i). A large number did not draw a bar for water as response to (b) (ii) – virtually all who did so gained the mark. Most candidates did not get a mark for (b) (iii), not recognising that the three sub-sections of part (b) were linked. Virtually all of these opted for a dense material, such as plastic, fibreglass or metal: strength, not buoyancy, was the factor which featured in their explanations.
	b		Particle arrangement ✓ Mass of particles ✓	2 (2 × AO1.1)	**Examiner's Comments** 'Specific heat capacity' was a common incorrect answer here.
			Total	**6**	
8			**Any two from**: More/new information available ✓ More experiments completed ✓ New models/theories ✓ Better equipment / new technology ✓ Collaboration between scientists ✓ Peer-review ✓	2 (2× AO1.2)	**Examiner's Comments** Answers were not always expressed particularly well but were often actually very good; clear reference to new experimentation or to revised models of the atom each scored a mark and were frequently seen.
			Total	**2**	
9			125 (cm^3) ✓	1 (AO2.1)	**Examiner's Comments** Most candidates gained this mark.

			Total	**1**	
10		i	Nucleus ✓	1 (AO1.1)	
		ii	Proton ✓ Neutron ✓	2 (2× AO1.1)	In either order
		iii	Electron ✓	1 (AO1.1)	
		iv	Neutral ✓	1 (AO1.1)	**ALLOW** 0 / no charge /AW **Examiner's Comments** All parts of this question were answered very well. There were numerous mis-spellings in part (a) although all the words were given in the list above; the mis-spellings were not penalised if the meaning was clear.
			Total	**5**	