Question	Answer	Marks	AO Element	Notes	Guidance
1	melting / ice melts / ice goes from solid to liquid	**1**			
	any four from: - in solid particles regularly arranged - in solid particles arranged in fixed position / cannot move - particles in solid absorb energy - particles (in solid) vibrate more / particles start to move when heated - forces between particles (in solid) broken - particles in liquid slide over each other / move - particles in liquid not regularly arranged	**4**			

Question	Answer	Marks	AO Element	Notes	Guidance
2	any four from: - particles in the liquid slide over each other / move slowly / restricted movement - particles in the liquid not regularly arranged / randomly arranged - particles close together in liquid - in the gas particles arranged randomly / are anywhere - in the gas particles move from place to place / move freely / move fast - particles far apart in the gas	**4**			
3	any four from: • in solid particles regularly arranged; • in solid particles arranged in fixed position / cannot move or vibrate; • particles close together in solid; • particles in liquid slide over each other / move; • particles in liquid not regularly arranged; • particles close together in liquid;	**4**			

Question	Answer	Marks	AO Element	Notes	Guidance
4	liquids / water have particles close together / touching	**1**			
	gases / helium have particles far apart / room between gas particles / more space between gas particles	**1**			
	volume of liquid does not decrease / liquid not compressed / liquid not squeezed / plunger does not move	**1**			
	volume of gas decreases / gas compressed / plunger moves	**1**			
5	krypton	**1**			
6	liquid	**1**			
7	liquid	**1**			

Question	Answer	Marks	AO Element	Notes	Guidance
	particles close together	**1**			
	particles randomly arranged / no fixed arrangement / irregular arrangement	**1**			
8	*Any 3 of*: - diffusion - (bulk) movement of particles from high to low concentration - particles are in constant motion - (movement of particles is) random - bromine particles spread (throughout the solvent particles) / bromine particles mix up (with solvent)	**3**			
9	liquid	**1**			
	particles close together / touching	**1**			

Question	Answer	Marks	AO Element	Notes	Guidance
	particles randomly arranged / no fixed arrangement	**1**			
10	*Any three of:* - movement of particles - diffusion - particles collide with each other / particles bounce off each other - spreading out of particles - random (movement of particles) - (particles move) from higher to lower concentration	**3**			
11	goes from solid to gas (1) directly / without liquid (being formed) (1)	**2**			

Question	Answer	Marks	AO Element	Notes	Guidance
12	any three of: - evaporation / molecules escape from surface of ammonia - diffusion - molecules in (constant) movement / molecules collide - (movement of) molecules is random / in every direction - molecules spread out / molecules mix - (molecules spread) from higher concentration to lower concentration - (smell occurs when) molecules hit (the sensory cells in) the nose	**3**			
13	A: freezing (1) B: condensing / condensation (1)	**2**			
14	A: melting (1) B: condensing / condensation (1)	**2**			
15	increasing the pressure decreases the volume / decreasing the pressure increases the volume / the higher the volume, the lower the pressure	**1**			

Question	Answer	Marks	AO Element	Notes	Guidance
16	idea of solid turning (directly) to gas	**1**			
17	**P** = melting (1) **Q** = condensing / condensation (1)	**2**			
18(a)	**U**	**1**			
18(b)	**T**	**1**			
18(c)	**S**	**1**			
18(d)	**R**	**1**			
19	arrangement: in layers / regular / lattice (1) motion: (only) vibrating (1)	**2**			
20	goes (directly) from solid to vapour / gas (without liquid state being formed)	**1**			
21(a)	(boiling point) increases	**1**			
21(b)	any value between –8 and –80 (°C) inclusive of these values	**1**			

Question	Answer	Marks	AO Element	Notes	Guidance
21(c)	arrangement: irregular / random / no particular arrangement (1) separation: close together / touching (1)	**2**			
22	sublimation	**1**			
23	D - sublimation	**1**			
24	C - The sugar cube dissolves and its molecules diffuse.	**1**			
25	B	**1**			
26	B	**1**			
27	C	**1**			
28	D - Molecules in bromine and air moved randomly.	**1**			
29	C - The molecules spread further into the air.	**1**			
30(a)	(anhydrous) cobalt chloride	**1**			
30(b)	graphite	**1**			

Question	Answer	Marks	AO Element	Notes	Guidance
30(c)	calcium oxide	**1**			
30(d)	aluminium	**1**			
30(e)	ceramic	**1**			
31	***liquid:*** particles sliding over each other / particles moving slower than in gas (1) particles close together / particles touching (1) ***gas:*** particles moving rapidly / particles moving randomly (1) particles far apart (1)	**4**			

Question	Answer	Marks	AO Element	Notes	Guidance
32	1 mark each for any three of: - evaporation / molecules escape from aqueous ammonia - diffusion - molecules in (constant) movement / molecules collide - (movement of) molecules is random / in every direction - molecules spread out / molecules mix - (molecules spread) from higher concentration to lower concentration - (ammonia) molecules react with litmus	**3**			
33	***solid:*** particles (only) vibrating (1) particles close together / particles touching (1) ***gas:*** particles moving rapidly / particles moving randomly (1) particles far apart (1)	**4**			

Question	Answer	Marks	AO Element	Notes	Guidance
34	***solid:*** particles arranged regularly / particles ordered (1) particles touching / particles close together (1) ***liquid:*** particles arranged irregularly / particles randomly arranged (1) particles close together / particles touching (1)	**4**			
35(a)	neutralisation	**1**			
35(b)	1 mark each for any three of: ∞ evaporation / molecules escape from surface of the liquids ∞ diffusion ∞ molecules in (constant) movement / molecules collide ∞ (movement of) molecules is random / in every direction ∞ molecules spread out / molecules mix ∞ (molecules spread) from higher concentration to lower concentration ∞ molecules react (when they collide)	**3**			

Question	Answer	Marks	AO Element	Notes	Guidance
36	*liquid*: particles not arranged regularly / particles randomly arranged / irregular arrangement (1) particles sliding over each other / particles moving randomly (1) *gas*: particles not arranged regularly / particles arranged irregularly / particles randomly arranged (1) particles moving fast / particles moving randomly / particles moving in any direction (1)	**4**			
37(a)	solid (1) 100 ºC is lower than the melting point / the melting point is higher than 100 ºC (1)	**2**			
37(b)	The melting point of impure **S** is below 159 °C and the boiling point is above 200 °C.	**1**			

Question	Answer	Marks	AO Element	Notes	Guidance
38	increasing the temperature increases the volume / volume proportional to temperature	**1**			
39	*solid*: particles touching / particles close together (1) particles (only) vibrating / not moving from place to place (1) *gas*: particles far apart (1) particles moving fast / particles moving randomly / particles moving in any direction (1)	**4**			
40(a)	arrow under the ceramic boat	**1**			
40(b)	direct change from solid to gas (without any liquid state forming)	**1**			
40(c)	any **two** from: • (hot iron(III) chloride is a) vapour / gas • flask is cooler • so iron(III) chloride goes from vapour to solid (where flask cooler)	**2**			

Question	Answer	Marks	AO Element	Notes	Guidance
40(d)	idea of one substance forming two or more substances	**1**			
					[Total: 104]