Question number	Answer	Notes	Marks
1 (a)	**B** (condensation)		1
(b)	**M1** (the particles/they) lose (kinetic) energy / have less energy	ACCEPT lose potential/heat energy	3
	M2 (the particles/they) move closer together / pack more closely	ACCEPT not as many gaps / smaller gaps REJECT refs to density	
	M3 (the particles/they) do not move as freely / move more slowly / move less randomly	ACCEPT molecules for particles	
	NB M1, M2 and **M3** can be scored anywhere across the whole answer	REJECT atoms **once only**.	

<table>
<tr><th>Question number</th><th>Answer</th><th>Notes</th><th>Marks</th></tr>
<tr><td>2 a</td><td>
<table>
<tr><th>Change of state</th><th>State symbol before change</th><th>State symbol after change</th></tr>
<tr><td>Water boils in a kettle</td><td>l</td><td>g</td></tr>
<tr><td>Ethene is converted to poly(ethene)</td><td>g</td><td>s</td></tr>
<tr><td>Crystals of iodine sublime on heating</td><td>s</td><td>g</td></tr>
</table>
</td><td>M1 l AND g in first row
M2 g AND s in second row
M3 s AND g in third row
Accept upper case letters, eg S in place of s
Accept words, eg liquid in place of l
Accept answers in brackets</td><td>3</td></tr>
<tr><td>b</td><td>$CaCO_3(s) + 2HCl(aq) \rightarrow CaCl_2(aq) + H_2O(l) + CO_2(g)$</td><td>Award 1 mark for s and g correct
Award 1 mark for other 3 correct
Accept upper case
Reject words</td><td>2</td></tr>
<tr><td>c</td><td>s / solid</td><td>Accept upper case S in place of s</td><td>1</td></tr>
</table>

Question number	Answer	Notes	Marks
1 a i	six circles separated from each other	Accept minimum of 4 complete circles Ignore size and shape of circles Ignore arrows and other symbols implying movement Ignore a pattern Reject any touching circles Reject circles joined by bonds No penalty for half-circles at edges of square	1
ii	B (They move randomly in the liquid state)		1
iii	D (melting)		1
b i	B (condensing and evaporating)		1
ii	D ($N_2(l)$)		1
			Total 5 marks

Question number	Answer	Notes	Marks
1 (a)	Diagram shows four circles well-spaced apart	accept minimum of 3 complete circles ignore size and shape of circles ignore arrows and other symbols implying movement ignore a pattern reject any touching circles reject circles joined by bonds no penalty for half-circles at edges of square	1
(b)	move freely/randomly	Accept fast OWTTE ignore references to vibrate	1
(c)	**M1** – (average kinetic) energy of the particles increases **M2** – more particles have enough energy to escape / particles can escape more easily OR more particles overcome the forces (of attraction) holding them together (in the liquid) OR the forces (of attraction) between the particles are overcome more often	accept particles move faster/more rapidly/more quickly allow the energy of the liquid increases accept particles escape more quickly accept molecules/atoms for particles for both M1 and M2 allow bonds for force of attraction	2
			Total 4 marks

Question number	Answer	Accept	Reject	Marks
1 (a)	**B** – (filter) funnel			1
	D – test tube/boiling tube			1
	E - pipette		teat pipette/dropping pipette	1
	F - beaker			1
(b)	**M1 -** A			1
	M2 - E			1

(Total marks for Question 1 = 6 marks)

Question number			Answer	Notes	Marks
1	a	i	steam	Accept gas / vapour	1
		ii	ice	Accept solid	1
		iii	ice	Accept solid	1
	b	i	D (melting)		1
		ii	B (condensing)		1
	c		D (solid to gas)		1
	d	i	exothermic		1
		ii	$H_2O(g) \rightarrow H_2O(l)$	Accept multiples and fractions	1

(Total for Question 1 = 8 marks)

Question number	Answer	Accept	Reject	Marks
2 (a)	X boiling			1
	Y condensing			1
	Z freezing			1
(b)	C The particles move freely.			1
(c) (i)	thermometer			1
(ii)	it/water boils at 100°C	water does not get hotter than 100°C		1
	OR			
	it/water boils below the melting point of (solid) Q / 140°C / boils before Q melts **IGNORE** evaporates	reverse argument		
(iii)	to keep the liquid at an even/equal temperature (throughout)	OWTTE	words that imply constant temperature, eg steady	1
	OR			
	to avoid the <u>bottom</u> of the liquid from overheating/the <u>bottom</u> getting hotter than the rest of the liquid/to evenly distribute the heat/to avoid hot spots **IGNORE** references to increasing movement, etc of particles			
			Total	**7**

Question number	Answer	Notes	Marks
2 (a) (i)	element(s)		1
(ii)	compound		1
(iii)	mixture		1
(iv)	element		1
(b) (i)	solid		1
(ii)	gas		1

Total 6 marks

Question number	Answer	Notes	Marks
3 (a)	3		1
(b)	ammonia / NH_3 hydrogen chloride / HCl	Do not accept ammonium Do not accept hydrochloric acid Accept in either order. If name and formula given, both must be correct. Ignore state symbols, except HCl (aq)	1 1
(c)	ammonium chloride / NH_4Cl	Do not accept ammonia chloride. If name and formula given, both must be correct.	1
(d)	cross in box 2 (decomposition) cross in box 4 (neutralisation)		1 1

Total 6 marks