

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

Question number	Answer			Notes	Marks												
2 a	<table border="1"> <thead> <tr> <th data-bbox="344 301 785 473">Change of state</th> <th data-bbox="785 301 989 473">State symbol before change</th> <th data-bbox="989 301 1192 473">State symbol after change</th> </tr> </thead> <tbody> <tr> <td data-bbox="344 473 785 567">Water boils in a kettle</td> <td data-bbox="785 473 989 567" style="text-align: center;">l</td> <td data-bbox="989 473 1192 567" style="text-align: center;">g</td> </tr> <tr> <td data-bbox="344 567 785 661">Ethene is converted to poly(ethene)</td> <td data-bbox="785 567 989 661" style="text-align: center;">g</td> <td data-bbox="989 567 1192 661" style="text-align: center;">s</td> </tr> <tr> <td data-bbox="344 661 785 758">Crystals of iodine sublime on heating</td> <td data-bbox="785 661 989 758" style="text-align: center;">s</td> <td data-bbox="989 661 1192 758" style="text-align: center;">g</td> </tr> </tbody> </table>			Change of state	State symbol before change	State symbol after change	Water boils in a kettle	l	g	Ethene is converted to poly(ethene)	g	s	Crystals of iodine sublime on heating	s	g	<p>M1 l AND g in first row</p> <p>M2 g AND s in second row</p> <p>M3 s AND g in third row</p> <p>Accept upper case letters, eg S in place of s</p> <p>Accept words, eg liquid in place of l</p> <p>Accept answers in brackets</p>	3
Change of state	State symbol before change	State symbol after change															
Water boils in a kettle	l	g															
Ethene is converted to poly(ethene)	g	s															
Crystals of iodine sublime on heating	s	g															
b	$\text{CaCO}_3(\text{s}) + 2\text{HCl}(\text{aq}) \rightarrow \text{CaCl}_2(\text{aq}) + \text{H}_2\text{O}(\text{l}) + \text{CO}_2(\text{g})$			<p>Award 1 mark for s and g correct</p> <p>Award 1 mark for other 3 correct</p> <p>Accept upper case</p> <p>Reject words</p>	2												
c	s / solid			Accept upper case S in place of s	1												

Question number	Answer	Notes	Marks	
3 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
	ii i	D (melting)		1
b	i	B (condensing and evaporating)	1	
	ii	D ($N_2(l)$)	1	
			Total 5 marks	

Question number	Answer	Notes	Marks
4 (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)	<p>M1 – (average kinetic) energy of the particles increases</p> <p>M2 – <u>more</u> particles have enough energy to escape / particles can escape <u>more</u> easily OR <u>more</u> particles overcome the forces (of attraction) holding them together (in the liquid) OR the forces (of attraction) between the particles are overcome <u>more</u> often</p>	accept particles move faster/more rapidly/more quickly allow the energy of the liquid increases accept particles escape <u>more</u> 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
5 (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
6	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	$\text{H}_2\text{O}(\text{g}) \rightarrow \text{H}_2\text{O}(\text{l})$	Accept multiples and fractions	1

(Total for Question 1 = 8 marks)

Question number	Answer	Accept	Reject	Marks
7 (a)	X boiling Y condensing Z freezing			1 1 1
(b)	C The particles move freely.			1
(c) (i)	thermometer			1
(ii)	it/water boils at 100°C OR it/water boils below the melting point of (solid) Q / 140°C / boils before Q melts IGNORE evaporates	water does not get hotter than 100°C reverse argument		1
(iii)	to keep the liquid at an even/equal temperature (throughout) 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	OWTTE	words that imply constant temperature, eg steady	1
			Total	7

Question number	Answer	Notes	Marks
8 (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
9 (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 ₄ Cl	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