

Question number		Answer	Notes	Marks
1 (a) (i)		C (decreases by 2)		1
(ii)		D (decreases by 4)		1
(b)		D (has less penetrating power)		1
(c)		<p>Any four of:</p> <p>MP1 Use of ratemeter / scaler / counter;</p> <p>MP2 Idea of measuring <u>background</u> radiation e.g. background count / correction / subtraction;</p> <p>MP3 A safety precaution (based on distance or absorption) e.g. use of tongs / shielding;</p> <p>MP4 A controlled variable (time / distance / positioning) e.g. "source near/by/to detector", "for a minute";</p> <p>MP5 A practical consideration e.g. repeat / average / reset (scaler);</p> <p>MP6 Mention of becquerel / Bq</p>	<p>Allow description e.g. "count the clicks"</p> <p>Allow Geiger counter</p> <p>Ignore GM detector or tube</p> <p>Ignore descriptions of GM tube</p> <p>Allow "stand back", "wear gloves / protective clothing" "do not point source at people"</p> <p>Ignore "counts per minute"</p> <p>Ignore: mention of anomalies</p> <p>Accept phonetic spellings</p>	4

Total for question 1 = 7 marks

Question number		Answer	Notes	Marks
3 (a) (i)		90 (K)		1
(ii)		<p>Any three of</p> <p>MP1 Idea that particles/molecules move apart;</p> <p>MP2 Idea that particles/molecules gain (kinetic) energy;</p> <p>MP3 Idea that particles/molecules move more freely;</p> <p>MP4 Idea that particles/molecules leave the liquid;</p>	<p>Ignore: molecules vibrate</p> <p>Allow: molecules spread out, take up more space</p> <p>May be shown on labelled diagram</p> <p>Allow: idea of moving faster</p> <p>Ignore: 'move more'</p> <p>Allow bonds break</p> <p>Ignore unqualified 'move more'</p> <p>Allow escape</p> <p>Ignore evaporate</p>	3
(b) (i)		<p>Any two of</p> <p>MP1 radiation / infrared;</p> <p>MP2 Idea of reflection;</p> <p>MP3 Idea of little/no absorption;</p> <p>MP4 Idea of poor emission;</p>	<p>Allow IR</p> <p>Allow bad radiator</p>	2
(ii)		<p>Any two of</p> <p>(in a vacuum there are) no atoms/molecules/particles;</p> <p>so no/poor conduction;</p> <p>so no/little convection (currents);</p>	<p>Allow:</p> <p>no 'medium'</p> <p>no 'material'</p> <p>There are no molecules to conduct = 2 marks</p> <p>There are no molecules to convect = 2 marks</p>	2

(c)		<p>Any two of</p> <p>MP1 Idea that there is cold gas/air/oxygen just above the liquid (surface);</p> <p>MP2 Idea that the gas/air/oxygen in the room is warmer;</p> <p>MP3 Idea that convection currents in air (above liquid surface) unlikely;</p> <p>MP4 Idea that (evaporated) oxygen /air / gas would insulate the surface;</p> <p>MP5 Idea that oxygen/gas would build up pressure in a sealed vessel;</p>	<p>Ignore “heat rises”</p> <p>Allow: warm air won’t fall, cool air won’t rise Ignore density arguments Allow: gas is a poor conductor Allow: flask would burst if it had a lid</p>	2
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Total for question 3 = 10 marks