

Name of the Student: \_\_\_\_\_

Max. Marks : 18 Marks

Time : 18 Minutes

Mark Schemes

**Q1.**

- (a) atoms with the same number of protons  
*allow atoms of the same element* 1
- but with a different number of neutrons 1
- (b) protons = 11 1
- neutrons = 12 1
- (c) electrons falling to a lower energy level 1
- (d)

<b>Level 2:</b> Scientifically relevant facts, events or processes are identified and given in detail to form an accurate account.	3-4
<b>Level 1:</b> Facts, events or processes are identified and simply stated but their relevance is not clear.	1-2
No relevant content	0
<b>Indicative content</b> <b>solid</b> <ul style="list-style-type: none"> <li>atoms closely packed</li> <li>atoms in a regular arrangement</li> <li>atoms vibrate about a fixed position</li> </ul> <b>liquid</b> <ul style="list-style-type: none"> <li>atoms are close together</li> <li>atoms are not in regular arrangement</li> <li>atoms can move past each other</li> </ul> <b>gas</b> <ul style="list-style-type: none"> <li>atoms are well separated</li> <li>atoms are not in regular arrangement</li> <li>atoms move randomly at high speeds</li> </ul>	

(e)	60 × 60	1
	E = 150 × 3600	1
	E = 540 000 (J)	
	<i>an answer of 540 000 (J) scores 3 marks</i>	1
(f)	less energy transferred	1
	not as bright	1
		<b>[14]</b>

## Q2.

(a)	2 protons and 2 neutrons	
	<i>accept 2p and 2n</i>	
	<i>accept (the same as a) helium <u>nucleus</u></i>	
	<i>symbol is insufficient</i>	
	<i>do not accept 2 protons and neutrons</i>	1
(b)	(i) gamma rays	1
	(ii) loses/gains (one or more) <u>electron(s)</u>	1
(c)	any <b>one</b> from:	
	• wear protective clothing	
	• work behind lead/concrete/glass shielding	
	• limit time of exposure	
	• use remote handling	
	<i>accept wear mask/gloves</i>	
	<i>wear goggles is insufficient</i>	
	<i>wear protective equipment/gear is insufficient</i>	
	<i>accept wear a film badge</i>	
	<i>accept handle with (long) tongs</i>	
	<i>accept maintain a safe distance</i>	
	<i>accept avoid direct contact</i>	1
		<b>[4]</b>