

Question number	Answer				Notes	Marks																
7 (a)	<div><div><div>description</div><div>electromagnetic waves</div><div>particles with a negative charge</div><div>particles with a positive charge</div></div><div><div>type of radiation</div><div>alpha</div><div>beta</div><div>gamma</div><div>neutron</div></div></div> <div>positive charge to alpha; negative charge to beta; electromagnetic waves to gamma;</div>				One mark for each correct line Minus one mark for two lines from any one box on the left	(3)																
(b) (i)	in this order only: gamma, beta, alpha;					(1)																
(ii)	any two from: can damage cells; can cause mutation; can cause cancer;				allow kill cells/tissues radiation burns radiation poisoning change genes	(2)																
(c)	<table><tr><td></td><td>0.1 cm paper</td><td>0.5 cm aluminium</td><td>0.5 cm lead</td></tr><tr><td>alpha radiation</td><td>stopped</td><td>stopped</td><td>stopped</td></tr><tr><td>beta radiation</td><td>goes through</td><td>stopped</td><td>stopped</td></tr><tr><td>gamma radiation</td><td>goes through</td><td>goes through</td><td>goes through</td></tr></table> Each row correct for 1 mark;;;					0.1 cm paper	0.5 cm aluminium	0.5 cm lead	alpha radiation	stopped	stopped	stopped	beta radiation	goes through	stopped	stopped	gamma radiation	goes through	goes through	goes through		(3)
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alpha radiation	stopped	stopped	stopped																			
beta radiation	goes through	stopped	stopped																			
gamma radiation	goes through	goes through	goes through																			
(d)	any suitable device e.g. (thin window) GM tube; cloud chamber; spark chamber; semiconductor detector;				accept spelling mistakes Geiger counter NB do not accept repeat of stem (film badge or photographic film)	(1)																

**Total for Question 7 = 10 marks**