

Radioactivity 1

Name & Set

(a) What is an atom?

[2]

(b) How can we distinguish one element from another?

[1]

(c) Name three different elements.

(i) An element that is classed as a metal. _____ [1]

(ii) An element that is classed as a non-metal. _____ [1]

(iii) an element that is a gas under normal conditions _____ [1]

(d) What does the word ISOTOPE mean?

[2]

(e) How many isotopes does hydrogen have? _____ [1]

(f) Name the isotope of hydrogen with the most number of neutrons. _____ [1]

(g) Name an isotope of hydrogen with no neutrons _____ [1]

(h) What do the following symbols stand for?

	Symbol	Name	
(i)	X		[1]
(ii)	Z		[1]
(iii)	A		[1]

(i) An isotope of palladium is written ${}_{91}^{234}\text{Pa}$

(i) How many protons does it have _____ [1]

(ii) How many neutrons does it have _____ [1]

(iii) How many electrons does it have _____ [1]

(j) Draw a labelled diagram in the space below to show the structure of each nucleus. The first one has been started for you.

${}^4_2\text{He}$	${}^{13}_8\text{O}$	${}^8_4\text{Be}$

(k) What two things happen when a nucleus decays?

(i) _____ [1]

(ii) _____ [1]

(l) What is a radioisotope? _____ [1]

(m) What becomes of the atom that has decayed?

_____ [1]

(n) Can we predict when a nucleus will decay? _____ [1]

(o) Can the same isotope emit alpha particles and beta particles? _____ [1]

(p) List two effects by which the particles emitted by a radioisotope can be detected?

(i) _____ [1]

(ii) _____ [1]

(q) Give one way in which we can distinguish between different types of radiation?

 _____ [2]

(r) Identify the radiation by its symbol and fill in the table.

	Symbol	Name	Composition	
(i)	α			[2]
(ii)	β			[2]
(iii)	γ			[2]

(s) Identify the particle emitted in the following decays:

${}_{88}^{226}\text{Ra} \rightarrow {}_Z^A\text{Rn} + ?$		[1]
${}_1^3\text{H} \rightarrow {}_2^3\text{He} + ?$		[1]
${}_{92}^{238}\text{U} \rightarrow {}_{90}^{234}\text{Th} + ?$		[1]
${}_6^{14}\text{C} \rightarrow {}_7^{14}\text{N} + ?$		[1]

(u) What does 'count rate' mean?

[1]

Vocabulary

Find the definitions of the following terms used in nuclear physics.

Word	Definition
<i>Alpha-particle</i>	
<i>Atom</i>	
<i>Background radiation</i>	
<i>Beta particle</i>	
<i>Count rate</i>	
<i>Electron</i>	
<i>Gamma-radiation</i>	
<i>Half-life</i>	
<i>Ionised</i>	
<i>Isotope</i>	
<i>Molecule</i>	
<i>Neutron</i>	
<i>Proton</i>	
<i>Radiactivity</i>	
<i>Radioactive decay</i>	
<i>X-ray</i>	