Oxford Cambridge and RSA

GCSE Physics A (Gateway)

J249/04 Physics A P5-P8 and P9 (Higher Tier)

Question Set 26

Multiple Choice Questions

P6: Radioactivity

1 Which statement describes nuclear fusion?

A A helium nucleus joins with a hydrogen nucleus to form an alpha particle.

B Two helium nuclei join to form a hydrogen nucleus.

C Two hydrogen nuclei join to form a helium nucleus. ← fusion

D Uranium nuclei split and produce high energy neutrons causing a chain reaction. ← fission

Your answer [C]

[1]

2 An element has more than one isotope.

Which row correctly describes the atoms of **all** isotopes of this element?

	Numbers of electrons	**Numbers of protons**	**Numbers of neutrons**
A	different	different	different
B	same	different	different
C	same	same	different
D	same	different	same

Your answer [C]

[1]

3 Radium-226 is the most abundant isotope of radium.

Its nuclear mass is 226 and its nucleus contains 138 neutrons.

Which row is correct for another isotope of radium?

A nuclear mass 226; 137 neutrons ✗

B nuclear mass 226; 139 neutrons ✗

C nuclear mass 227; 138 neutrons ✗

D nuclear mass 227; 139 neutrons

226 − 138 = 88 protons

227 − 139 = 88

Your answer [D]

[1]

4 Radium-226, $^{226}_{88}Ra$, decays to become radon-222, $^{222}_{86}Rn$.

What is emitted when a nucleus of radium-226 decays?

A A beta particle

B An alpha particle

C Four neutrons

D Four protons

Your answer B

[1]

eg
let n.o of atoms be 800

5 A radioactive source has a half-life of 80 s.

How long will it take for ⅞ of the source to decay?

$800 \times \frac{7}{8} = 700$

∴ 100 left

Time	n.o of atoms
0	800
80	400
160	200
240	100

A 10 s

B 70 s

C 240 s

D 640 s

Your answer C

[1]

6 Beta radiation is used to check the thickness of thin aluminium foil at a factory.

Why is beta radiation used?

A All electromagnetic radiation is reflected by aluminium foil.

B Beta radiation will not pass through aluminium foil.

C Beta radiation will partially pass through aluminium foil.

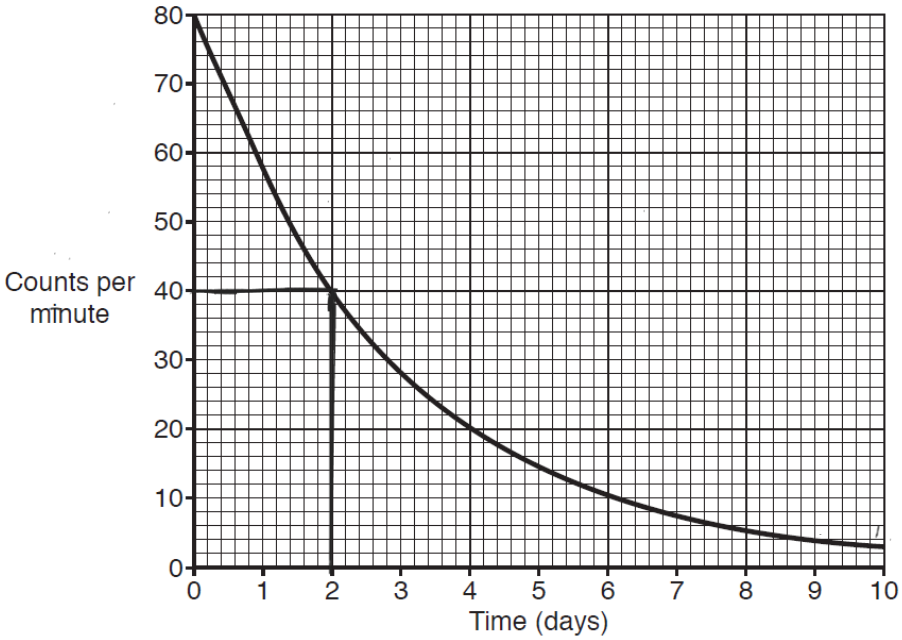
D Beta radiation is reflected by aluminium foil.

Your answer C

[1]

Beta radiation can penetrate thin aluminium foil but the amount of penetrating will vary sufficently as thickness changes.

7 A teacher measures the radiation from a radioactive source for 10 days.



What is the half-life of this radioactive source?

A 1 day

B 2 days

C 4 days

D 5 days

Your answer B

[1]

8 An alpha particle collides with an atom to produce a positive ion.

What happens to the atom for it to become a positive ion?

A It loses an electron from inside the nucleus.

B It loses an electron from outside the nucleus.

C It loses a neutron from inside the nucleus.

D It loses a proton from outside the nucleus.

Your answer B

[1]

9 The table gives some information about four radioactive isotopes.

Which isotope is the best to use as a medical tracer?

	Half life	Radiation emitted
A	6 hours	alpha
B	6 hours	gamma
C	6 minutes	gamma
D	6 years	beta

Your answer 

[1]

10 Which statement is **true** for isotopes of the same element?

N_p = number of protons and N_n = number of neutrons.

A $N_p = N_n$

B N_p is the same but N_n is different

C N_p is always greater than N_n

D The total ($N_p + N_n$) is always the same

Your answer 

[1]

Total Marks for Question Set 2: 10

Equations in physics

(final velocity)^2 – (initial velocity)^2 = 2 × acceleration × distance

change in thermal energy = mass × specific heat capacity × change in temperature

thermal energy for a change in state = mass × specific latent heat

energy transferred in stretching = 0.5 × spring constant × (extension)^2

potential difference across primary coil × current in primary coil = potential difference across secondary coil × current in secondary coil

Higher tier only –

force on a conductor (at right angles to a magnetic field) carrying a current = magnetic flux density × current × length