Practice Question Set For GCSE
Subject : Physics
Paper-1 Topic : 6_ Radioactivity

Name of the Student:_____
Max. Marks : 22 Marks **Time : 22 Minutes**

Mark Schemes
Q1.

	Answer	Additional guidance	Mark
	description to include: proton (1) becomes a neutron (1)	 award 2 marks for p → n award 2 marks for answers in terms of quarks: u→d or up → down or uud→udd if no other mark scored, allow 1 mark for any **one** of neutron becomes proton n → p d→u decrease in atomic number by one mass number stays the same gains a neutron reduce charge (of nucleus) by one responses referring to emission of gamma or neutrino	**(2)** **AO1**

Q2.

Question Number	Answer	Additional guidance	Mark
	processing (1) $\frac{125\ 000}{1\ 000\ 000}$ OR $\frac{1}{8}$ OR 3 half-lives or 3 x 5700 evaluation (1) 17 100	 accept an appropriate attempt using more than one halving 17 000 award full marks for the correct answer without working	**(2)**

Q3.

Question number	Answer	Mark
(i)	An answer that combines the following points of application of knowledge and understanding to provide a logical description: • proton number/atomic number decreases by 1 (1) • nucleon number/mass number remains unchanged (as p and n have same mass and mass of electron is (assumed) negligible) (1)	**(2)**

Question number	Answer	Mark
(ii)	C	(1)

Q4.

	Answer	Additional guidance	Mark
(i)	reading from graph (1) (at 5 degrees:) number between 10^6 and 10^7 **AND** (at 100 degrees:) 10^2 evaluation (1) $\frac{\text{number between } 10^6 \text{ and } 10^7}{10^2}$ **OR** between 10^4:1 and 10^5:1 between 10 000:1 and 100 000:1 **OR** between 10^4 and 10^5 between 10 000 and 100 000	(e.g. $10^{6.5}$) (e.g. $10^{4.5}$:1 or 10^7:10^2) allow any correct ratio not in its simplest form (e.g. $10^{4.5}$) award full marks for correct answer without working inverted ratio scores 1 mark maximum	(2) AO2

	Answer	Additional guidance	Mark
(ii)	an explanation including any **four** from: Observations most (alpha particles) pass (straight) through the foil (with little deflection) (1) some (alpha particles) are {scattered / deflected} through {small angles / less than 90 degrees} (1) (very) few (alpha particles) are {scattered / deflected} through {large angles / greater than 90 degrees} (1) Conclusions atoms are mainly empty space (1) there must be a nucleus / something inside the atom (1) (nucleus / something) must be {small / heavy / dense / concentrated / charged / positive} (1)	Ignore electrons ignore refracted allow repelled allow rebound / reflect / back scattering / bounce back ignore electrons	**(4)** **AO1,AO3**

Q5.

Question	Answer	Additional guidance	Mark
	an explanation linking any **four** of the following:- UV/energy absorbed by electrons (1) electrons change orbit/energy level/shell (1) electrons in an 'excited' state (1) electrons emit energy/ move to lower energy level/fall down/de-excite (1) (energy) emitted as (visible) light / at a different frequency/wavelength (1) (process is called) fluorescence / (light emitted is) fluorescent (1)	a labelled diagram can score up to 4 marks	**4** **AO1.1**

Q6.

	Answer	Mark
(i)	C $^{245}_{95}Am$ **A, B** and **D** are incorrect as these are not isotopes of americium.	**(1)** **AO1**

	Answer	Mark
(ii)	[x] **B** 5 cm **A, C** and **D** are incorrect as these are not the correct range of an alpha particle in air.	**(1)** **AO1**

	Answer	Additional guidance	Mark
(iii)	$^{4}_{2}\alpha$ (1) $^{237}_{\ \ \ }Np$ (1) $^{\ \ \ }_{93}Np$ (1)	both correct for the mark ecf from mp1 ecf from mp1	(3) AO2