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

Name of the Student:_____
Max. Marks : 21 Marks **Time : 21 Minutes**

Mark Schemes

Q1.

Question Number	Answer	Mark
	Answers will be credited according to candidate's deployment of knowledge and understanding of the material in relation to the qualities and skills outlined in the generic mark scheme. The indicative content below is not prescriptive, and candidates are not required to include all the material which is indicated as relevant. Additional content included in the response must be scientific and relevant. **AO3 Strand 2a and 2b (6 marks)** • shows some idea that the data can support arguments about alpha, beta and gamma radiation being present • argues that there is some evidence that alpha might be emitted (count rate going down with paper interposed) • argues that there is a lot of evidence that beta particles are emitted (count rate goes down a lot when the aluminium is inserted) • argues that there might be some gamma getting through (lead stopping everything apart from gamma) OR that with the lead present the count rate has gone down to a level consistent with background, so no gamma was present a level 3 answer will use data effectively	**(6)** AO 1 1

Level	Mark	Descriptor
	0	• No rewardable material.
Level 1	1-2	• Deconstructs scientific information but understanding and connections are flawed. An unbalanced or incomplete argument that provides limited synthesis of understanding. • Judgements are supported by limited evidence. (AO3)
Level 2	3-4	• Deconstructs scientific information and provides some logical connections between scientific concepts. An imbalanced argument that synthesises mostly relevant understanding, but not entirely coherently. • Judgements are supported by evidence occasionally. (AO3)
Level 3	5-6	• Deconstructs scientific information and provide logical connections between scientific concepts throughout. A balanced, well-developed argument that synthesises relevant understanding coherently. • Judgements are supported by evidence throughout. (AO3)

Q2.

	Answer	Additional guidance	Mark
(i)	an explanation linking: (control rods) absorb neutrons (1) (so) fewer (neutrons) available for chain reaction (1)	ignore slow down the nuclear chain reaction accept (control rods) block neutrons accept neutrons can't pass through (control rods) fewer fission(s) (reactions)	(2) AO1

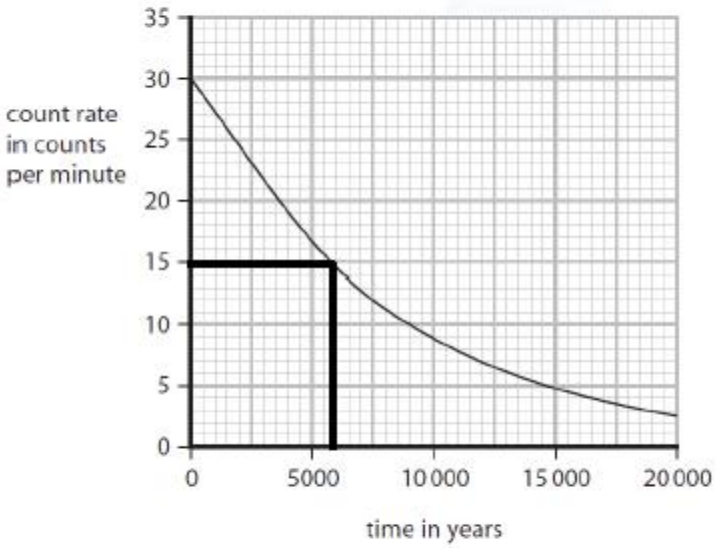
	Answer	Additional guidance	Mark
(ii)	$\frac{4(.0 \times 10^3)(\times 100)}{3(.0 \times 10^7)}$ (1) 1.3×10^{-2} (%) (1)	 0. 013 (%) allow 0.01 (%) power of ten error scores 1 mark maximum award full marks for the correct answer without working	(2) AO2

	Answer	Additional guidance	Mark
(iii)	A description to include: (from) kinetic energy (of fission fragments) (1) (transferred to) thermal energy (of coolant) (1)	accept references to energy stores accept energy in nuclear store accept nuclear energy / gamma radiation energy / binding energy / mass (to) thermal store (in coolant) accept heat for thermal allow steam transfers thermal energy/heat from reactor to kinetic energy of turbine for 2 marks	**(2)** **AO1**

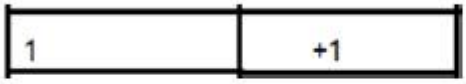
Q3.

Question Number	Answer	Additional guidance	Mark
(i)	6 / six		(1) AO1

Question Number	Answer	Additional guidance	Mark
ii	8 / eight		(1) AO2

Question Number	Answer	Additional guidance	Mark
(iii)	indication of horizontal line between 14 and 16 and / or vertical line between 5250 and 6250 (1)  value between 5250 (years) and 6250 (years) inclusive (1)	accept alternative indications e.g. cross on curve accept any halving pairs e.g. going between 20 cpm and 10 cpm award full marks for the correct answer with no working	(2) AO3

Q4.

Question Number	Answer	Mark
(i)	C  **A** is incorrect the proton has a mass of 1 not 0 **B** is incorrect the proton has a mass of 1 not 0 **D** is incorrect the proton has a charge of +1 not -1	**(1)** **AO1**

Question Number	Answer	Additional guidance	Mark
(ii)	substitution (1) ratio = $\frac{10^{-10}}{10^{-15}}$ evaluation (1) 10^{5}	$10^{-10} : 10^{-15}$ accept suitable equivalent ratios e.g. $1 \times 10^{5} : 1$ $1 : 10^{-5}$ or $10^{5} : 1$ 1: 0.00001 or 100000:1 allow 1 mark for inverted ratios e.g. $10^{-15} : 10^{-10}$ 0.00001:1 or 1:100000 award full marks for the correct answer with no working	**(2)** **AO2**

Question Number	Answer	Additional guidance	Mark
(iii)	an explanation linking same number / amount of (1) electrons and protons (1)	 equal number / amount of allow balanced (number / amount of) negative and positive charges ignore (neutral) neutrons reject positive/negative neutrons for 2nd marking point	(2) AO1