Eduqas Physics – Component 3

Module 6: Nuclear Decay

This topic covers the spontaneous nature of nuclear decay and the nature of alpha, beta and gamma radiation. It introduces the concept of half-life, activity and decay constant. Learners study the exponential decay law in both graphical and algebraic form.

You should be able to demonstrate and show your understanding of:	Progress and understanding:			
	1	**2**	**3**	**4**
The spontaneous nature of nuclear decay; the nature of α, β and γ radiation, and equations to represent the nuclear transformations using the $^{A}_{Z}X$ notation				
Different methods used to distinguish between α, β and γ radiation and the connections between the nature, penetration, and range for ionising particles				
How to make allowance for background radiation in experimental measurements				
The concept of the half-life, $T_{\frac{1}{2}}$				
The definition of the activity, A, and the Becquerel				
The decay constant, λ, and the equation $A = -\lambda N$				
The exponential law of decay in graphical and algebraic form, $N = N_0 e^{-\lambda t}$ and $A = A_0 e^{-\lambda t}$ or $N = \frac{N_0}{2^x}$ and $A = \frac{A_0}{2^x}$ where x is the number of half-lives elapsed – not necessarily an integer				
The derivation and use of $\lambda = \frac{\ln 2}{T_{\frac{1}{2}}}$				
SPECIFIED PRACTICAL WORK				
Investigation of radioactive decay – a dice analogy				
Investigation of the variation of intensity of gamma radiation with distance				