



Year 12 Physics  
HSC ER Questions 9.8.C – Radioactive Decay

Module 9.8 – From Quanta to Quarks

Topic 9.8.C – Radioactive Decay

Name

Date

2011

- (c) Copy and complete in your booklet the following table comparing forces in the atomic nucleus.

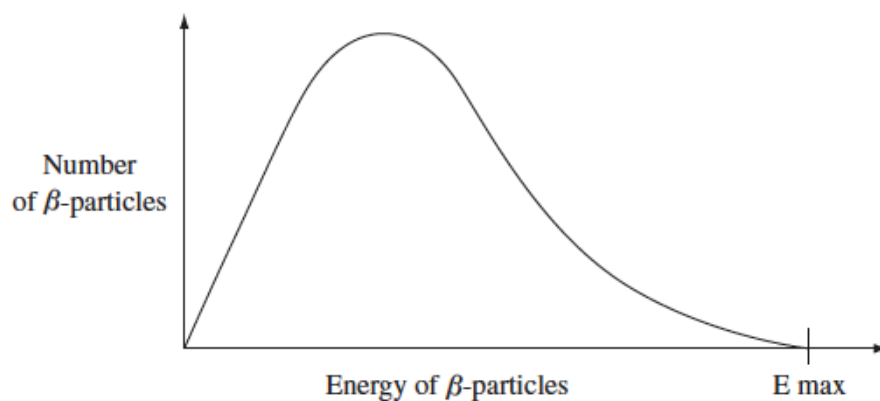
3

**Forces in atomic nucleus**

	<i>Gravitational</i>	<i>Electrostatic</i>	<i>Strong</i>
<i>Strength</i>	Low		
<i>Direction</i>	Attractive		
<i>Range</i>	Infinite		

2010

- (d)



How did Pauli account for the distribution of energies in the  $\beta$ -decay curve?

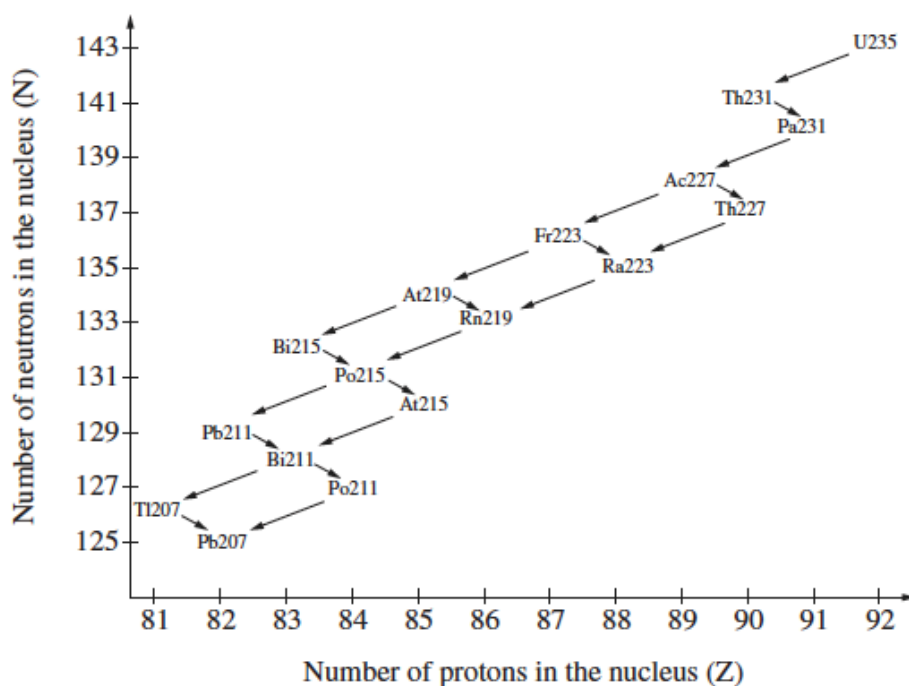
2

- (f) Account for the existence of stable isotopes, referring to the forces which act within the atomic nucleus.

3

2008

- (b) Nuclear transmutations caused by natural radioactivity can be represented in diagrams such as the one shown. Each symbol represents a radioactive element and each arrow represents a transmutation.



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- (i) How many protons and how many neutrons are there in the nucleus of a Thorium-227 atom? 1
- (ii) Write the equation for the  $\alpha$ -decay of Francium-223. 2

2007

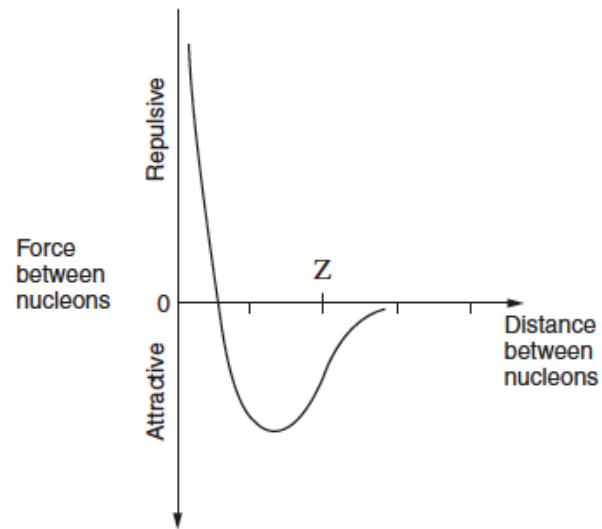
- (b) In your study of Quanta to Quarks you have performed an investigation to observe radiation emitted from a nucleus using a Wilson Cloud Chamber or a similar detection device.

- (i) Describe how you carried out your investigation. 2
- (ii) Isotopes can be used in medicine, agriculture and engineering. 4

Choose TWO of these areas and nominate a different isotope for use in each area.

For each isotope, explain how the properties of the isotope are related to its use.

- (d) (i) The graph shows the force between nucleons as a function of the distance between them. 2



Explain what would happen if two nucleons were separated by the distance indicated as Z on the graph.