

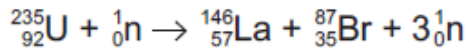
A level Physics B

H557/02 Scientific literacy in physics

Question Set 8

1

The equation shows a fission reaction.



- (a) Explain how this reaction can become a chain reaction and suggest how the rate of the reaction can be controlled.

[2]

- (b) The graph in **Fig. 1.1** shows the binding energies per nucleon of the nuclei involved in the reaction.

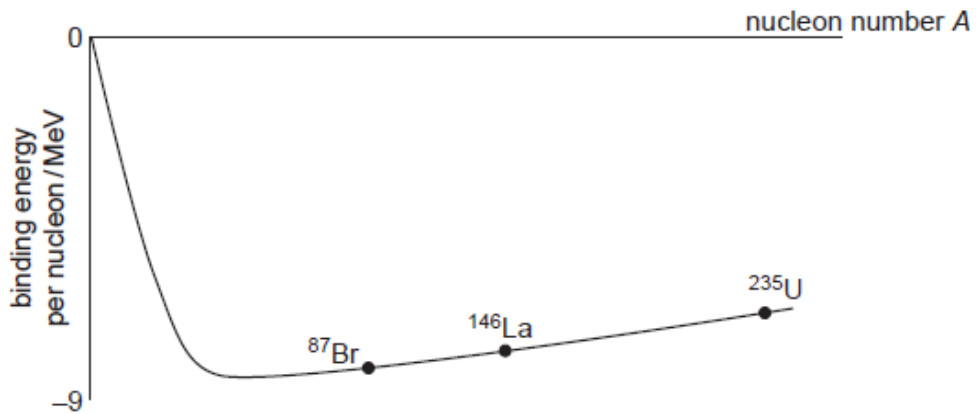


Fig. 1.1

Use the graph to explain why energy is released in the reaction.

[2]

- (c) Each fission reaction releases about 16 MeV. Calculate the mass change in a single reaction.

mass change =kg [3]

- (d) Each year, fission reactors around the world produce about 1.4×10^{18} J of useful energy. Use the data below to calculate an estimate of the time uranium reserves will last at the **current** rate of energy production. Suggest and explain why such an estimate may be inaccurate.

estimated mass of ²³⁵U available = 1.6×10^8 kg

mass of ²³⁵U atom = 3.9×10^{-25} kg.

efficiency of power stations = 30%

time uranium reserves will lastyears

[4]

Total Marks for Question Set 8: 11

OCR

Oxford Cambridge and RSA

Copyright Information

OCR is committed to seeking permission to reproduce all third-party content that it uses in its assessment materials. OCR has attempted to identify and contact all copyright holders whose work is used in this paper. To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced in the OCR Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download from our public website (www.ocr.org.uk) after the live examination series.

If OCR has unwittingly failed to correctly acknowledge or clear any third-party content in this assessment material, OCR will be happy to correct its mistake at the earliest possible opportunity.

For queries or further information please contact The OCR Copyright Team, The Triangle Building, Shaftesbury Road, Cambridge CB2 8EA.

OCR is part of the Cambridge Assessment Group; Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge