

- 7 Fig. 7.1 illustrates the variation with nucleon number  $A$  of the binding energy per nucleon  $E$  of nuclei.

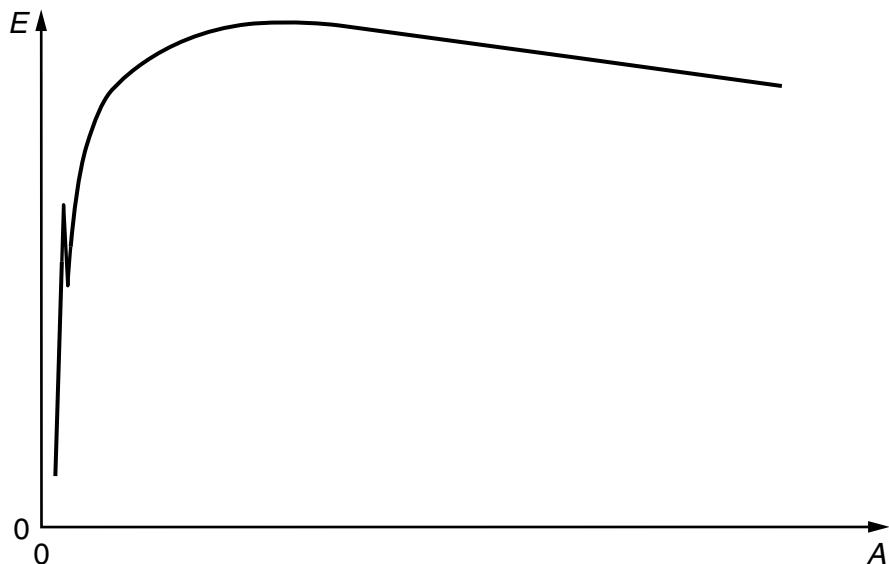


Fig. 7.1

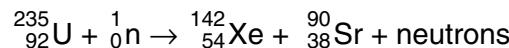
- (a) (i) Explain what is meant by the *binding energy* of a nucleus.

.....  
.....  
.....

[2]

- (ii) On Fig. 7.1, mark with the letter S the region of the graph representing nuclei having the greatest stability. [1]

- (b) Uranium-235 may undergo fission when bombarded by a neutron to produce Xenon-142 and Strontium-90 as shown below.



- (i) Determine the number of neutrons produced in this fission reaction.

number = ..... [1]

- (ii) Data for binding energies per nucleon are given in Fig. 7.2.

isotope	binding energy per nucleon / MeV
Uranium-235	7.59
Xenon-142	8.37
Strontium-90	8.72

**Fig. 7.2**

Calculate

1. the energy, in MeV, released in this fission reaction,

$$\text{energy} = \dots \text{ MeV} \quad [3]$$

2. the mass equivalent of this energy.

$$\text{mass} = \dots \text{ kg} \quad [3]$$

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