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

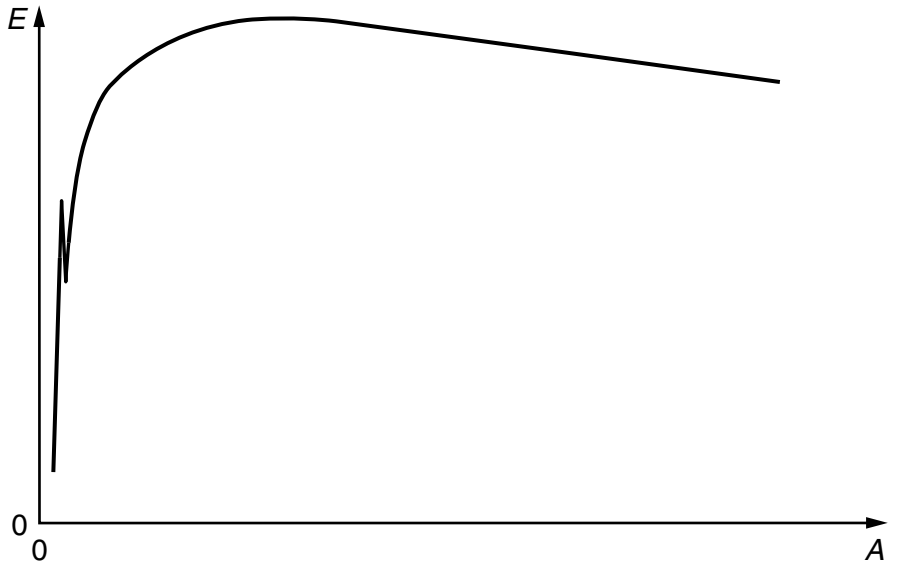

Fig. 7.1

(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.

$$^{235}_{92}\text{U} + {}^{1}_{0}\text{n} \rightarrow {}^{142}_{54}\text{Xe} + {}^{90}_{38}\text{Sr} + \text{neutrons}$$

(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,

energy = …… MeV [3]

2. the mass equivalent of this energy.

mass = …….…….. kg [3]

BLANK PAGE