Problem-17

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A heavy nucleus X of mass number 240 and binding energy per nucleon 7.6 MeV is split into two fragments Y and Z of mass numbers 110 and 130. The binding energy of nucleons in Y and Z is 8.5 MeV per nucleon. Calculate the energy Q released per fission in MeV

Solution:-

Nucleus X has 240 nucleons & $\frac{BE}{nucleon}$ = 7.6 MeV.

∴ Total energy of nucleus X is 240×7.6 MeV = 1824 MeV

Similarly, total energy of nucleus Y is

$110 \times 8.5 = 935$ MeV

Total energy of nucleus Z is

$130 \times 8.5 = 1105$ MeV

Reaction: $X \rightarrow Y + Z + Q(\text{energy})$

∴ Energy released

$Q = 935 + 1105 - 1824$

∴ $Q = 216$ MeV. —x— Ans