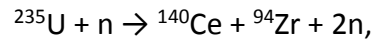


### Answer on Question #42889, Physics, Nuclear Physics

10. For the following fission reaction



Find the disintegration energy.

**Solution:**

Given:

$$M_u = 235.02 \text{ u},$$

$$M_n = 1.0 \text{ u},$$

$$M_{ce} = 139.9 \text{ u},$$

$$M_{zr} = 93.9 \text{ u},$$

$$Q = ?$$

The disintegration energy  $Q$  is the energy transferred from mass energy to kinetic energy of the decay products.

$$Q = m_i c^2 - m_f c^2$$

Initial mass is

$$m_i = M_u + M_n$$

The final mass is

$$m_f = M_{ce} + M_{zr} + 2M_n$$

Thus,

$$Q = (M_u - M_{ce} - M_{zr} - M_n)c^2$$

$$Q = (235.02 - 139.9 - 93.9 - 1.0) \cdot 931.5 \text{ MeV/u} = 204.93 \text{ MeV} \approx 205 \text{ MeV}$$

**Answer:**  $Q = 205 \text{ MeV}$ .