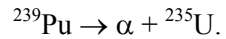


**AUTHORIZED REFERENCE: Calculator, Physics Reference Card**  
**Wt. No.**

- 20 1.  $^{239}\text{Pu}$  undergoes alpha decay according to the reaction:



- a) Calculate the disintegration energy associated with this decay. The masses you will need are:

$$^{239}\text{Pu}: 239.05216 \text{ u}$$

$$^{235}\text{U}: 235.04392 \text{ u}$$

$$^4\text{He}: 4.00260 \text{ u}$$

$$\underline{Q = +5.25 \text{ MeV}_{\text{ans}}}$$

- b)  $^{239}\text{Pu}$  has a half-life of 24110 y. Calculate the initial activity of a 1.00 kg sample.

$$\underline{R_0 = 2.30 \times 10^{12} \text{ Bq}_{\text{ans}}}$$

- 10 2. Organize each of the following pairs of ionizing radiation from lowest to highest RBE (each part has an answer).

(a)  $\alpha$  versus  $\beta$  answer:  $\beta$  ,  $\alpha$  \_\_\_\_\_

(b) n versus  $\gamma$  answer:  $\gamma$  , n \_\_\_\_\_

(c)  $\beta$  versus n answer:  $\beta$  , n \_\_\_\_\_