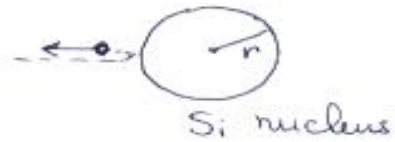
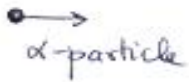


**Problem#4 (5 points)**

Estimate the size of silicon nucleus bombarded by an 8.0 MeV alpha particle ( $\text{He}^{2+}$ ). (For silicon,  $Z = 14$ ).

(Hint: Assume that the alpha particles have enough energy to reach the surface of silicon nucleus but do not penetrate.)



Use conservation of total energy of the system

$$K_{\alpha} + 0 = 0 + \frac{k(Ze)(2e)}{r}$$

$$\Rightarrow r = \frac{k(Ze)(2e)}{K_{\alpha}} = \frac{(9 \times 10^9)(14)(2)(1.6 \times 10^{-19})^2}{8 \times 10^6 \times 1.6 \times 10^{-19}}$$

$$r = 5. \times 10^{-15} \text{ m}$$