9 An alpha particle with initial kinetic energy 8.8×10^{-13} J approaches a nucleus of a gold $\left({}^{197}_{79}\text{Au}\right)$ atom.

Which of the following is an equation for the closest distance r, in metres, between the alpha particle and the nucleus?

☒ **A** $r = 8.99 \times 10^{9} \left(\dfrac{2 \times 1.6 \times 10^{-19} \times 79 \times 1.6 \times 10^{-19}}{8.8 \times 10^{-13}} \right)$

☒ **B** $r = \dfrac{2 \times 1.6 \times 10^{-19} \times 197 \times 1.6 \times 10^{-19}}{8.99 \times 10^{9} \times 8.8 \times 10^{-13}}$

☒ **C** $r = 8.99 \times 10^{9} \left(\dfrac{8.8 \times 10^{-13}}{4 \times 1.6 \times 10^{-19} \times 79 \times 1.6 \times 10^{-19}} \right)$

☒ **D** $r = 8.99 \times 10^{9} \left(\dfrac{2 \times 79}{8.8 \times 10^{-13}} \right)$

(Total for Question 9 = 1 mark)