3.19 This problem asks that we calculate the unit cell volume for Co which has an HCP crystal structure. In order to do this, it is necessary to use a result of Problem 3.6, that is

$$V_C = 6R^2c\sqrt{3}$$

The problem states that $c = 1.623a$, and $a = 2R$. Therefore

$$V_C = (1.623)(12\sqrt{3})\, R^3$$

$$= (1.623)(12\sqrt{3})(1.253 \times 10^{-8}\text{ cm})^3 = 6.64 \times 10^{-23}\text{ cm}^3 = 6.64 \times 10^{-2}\text{ nm}^3$$