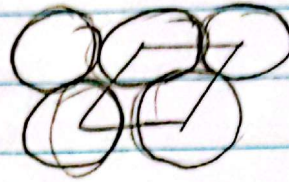


(4c)

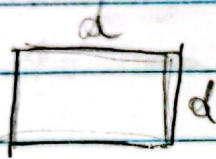
Front view



Bottom view

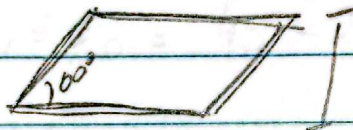


Front:



$$A_B = d^2$$

Bottom:



$$h = d \sin 60^\circ$$

$$V = d^3 \sin 60^\circ$$

Each slice of the space holds the volume of solid of a single sphere

$$V_{\text{sphere}} = \frac{4}{3} \pi \left(\frac{d}{2}\right)^3 = \frac{1}{6} \pi d^3$$

$$\phi = 1 - \frac{V_{\text{sphere}}}{V_{\text{slice}}} = 1 - \frac{\frac{1}{6} \pi d^3}{d^3 \sin 60^\circ} = \Delta$$

$$\phi = 39.54\%$$

Percent difference between cubic and hexagonal packing.

$$\Delta\phi = \phi_c - \phi_h = 44.6 - 39.54 = \Delta\phi = 8\%$$