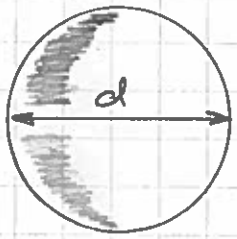
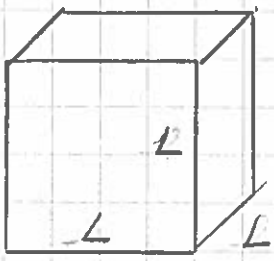
Copper Sphere



mass, M_C

$V = \frac{4}{3}\pi r^3$ $r = \frac{d}{2}$

Aluminum Cube



$L = 10\ cm = 0.10\ m$

mass, M_A

$V = L^3$

For the Aluminum Cube:

$$M_A = \rho_A (Volume) = \rho_A L^3$$

where: ρ_A = density of Aluminum

For Copper Sphere:

$$M_C = \rho_C (Volume) = \rho_C \frac{4}{3}\pi r^3$$

where: ρ_C = density of Copper

Now:

Mass of Sphere = Mass of Cube

So:

$$\rho_C \frac{4}{3}\pi r^3 = \rho_A L^3$$

$\therefore$

$$r = \left\{ \frac{3\rho_A L^3}{4\pi \rho_C} \right\}^{1/3}$$

From Table 18.1 (p. 491): $\rho_A = 2700\ kg/m^3$

$\rho_C = 8920\ kg/m^3$

$\therefore$ $r = 0.0416\ m \Rightarrow d = 0.0833\ m$

or, $\boxed{d = 8.33\ cm}$