50. (a) The period is $T = 27(3600) = 97200$ s, and we are asked to assume that the orbit is circular (of radius $r = 100000$ m). Kepler's law of periods provides us with an approximation to the asteroid's mass:

$$(97200)^2 = \left(\frac{4\pi^2}{GM}\right)(100000)^3 \quad \Longrightarrow \quad M = 6.3 \times 10^{16} \text{ kg} .$$

(b) Dividing the mass M by the given volume yields an average density equal to $6.3\times10^{16}/1.41\times10^{13} = 4.4 \times 10^3 \,\text{kg/m}^3$, which is about 20% less dense than Earth (the average density of Earth is given in a Table in Chapter 15).