



The University of Zambia
School of Natural Sciences
Department of Physics

PHY1015 Tutorial Sheet 01
Units

1. Convert (a) microliters to mm^3 (b) $4.5 \times 10^3 \text{ kg/m}^3$ to g/cm^3 (c) $40.0 \mu\text{L}$ to L (d) 400.00 dL to L (e) 0.04 mL to GL .
2. Suppose hair grows at a rate of 0.79375 mm per day. Find the rate at which it grows in nanometers per second. Because the distance between atoms in a molecule is on the order of 0.1 nm , your answer suggests how rapidly atoms are assembled in this protein synthesis.
3. The traffic light turns green, and the driver of a high performance car slams the accelerator to the floor. The accelerometer registers 22 m/s^2 . Convert this reading to km/min^2
4. An ampoule contains a solution of drug of $150 \frac{\mu\text{g}}{2.5 \text{ ml}}$. Convert this dose into grams per litre ($\frac{\text{g}}{\text{l}}$).
5. The skin is the largest organ in the human body. For a human adult, the average area of the skin surface is about 1.80 m^2 . How much square foot is this area?
6. If the density of carbon tetrachloride is 0.793 g/mL , and a sample has a volume of 9.29 mL , what is the mass?
7. Table salt has a density of 2.16 g/mL . If you used 2.00 mL on your food, how much in mg is that?
8. What is the density in g/mL of a substance that masses 0.987 kg and has a volume of $4.52 \times 10^2 \text{ mL}$?
9. How many (a) degrees Celsius are in 315 K , (b) degrees Fahrenheit are in 30.0°C , and (c) Kelvins are in -15.5°C ?
10. The human brain is located in the upper portion of the head with a volume that could be approximated by a cube $l = 20 \text{ cm}$ on a side. Brain cells, consisting of 10% neurons and 90% glia vary in size with dimensions ranging from a few micrometres to a metre or so. Taking $d = 10 \text{ micrometres}$ as a typical dimension and considering a cell to be a cube with each side having that length, estimate the number of brain cells in the human brain.