1. The wind is blowing with a velocity of 32 mi/h. How fast is this in units of m/s? Useful information: 1 min = 60 s; 60 min = 1 h; 1 mi = 1.609 km

\[
\left( \frac{32 \text{ mi}}{\text{h}} \right) \left( \frac{1.609 \text{ km}}{1 \text{ mi}} \right) \left( \frac{1000 \text{ m}}{1 \text{ km}} \right) \left( \frac{1 \text{ h}}{60 \text{ min}} \right) \left( \frac{1 \text{ min}}{60 \text{ s}} \right) = \frac{14}{5} \text{ m/s}
\]

Answer: \( \frac{14}{5} \text{ m/s} \)

2. Check the correct answer. The air in this room is an example of a:

- [ ] heterogeneous mixture
- [ ] homogeneous mixture
- [ ] compound
- [ ] pure substance

3. The SI unit for length is the \( \text{meter} \) (m)

4. Check the correct answer. How many mL are in 1 \( \mu \text{L} \)?

- [ ] \( 10^6 \) mL
- [ ] \( 10^9 \) mL
- [ ] \( 10^8 \) mL

Answer: \( 10^8 \text{ mL} \)

5. Check the correct answer. How many mg are in 1 kg?

- [ ] \( 10^8 \) mg
- [ ] \( 10^6 \) mg
- [ ] \( 10^3 \) mg

Answer: \( 10^8 \text{ mg} \)

6. The density of diethyl ether is 0.714 g/cm\(^3\). Use dimensional analysis to convert the density to units of kg/m\(^3\).

\[
\left( \frac{0.714 \text{ g}}{\text{cm}^3} \right) \left( \frac{\text{kg}}{1000 \text{ g}} \right) \left( \frac{100 \text{ cm}}{1 \text{ m}} \right)^3 = \frac{714}{1} \text{ kg/m}^3
\]

Answer: \( \frac{714}{1} \text{ kg/m}^3 \)
1. The density of toluene is 0.867 g/cm³. Use dimensional analysis to convert the density to units of kg/m³.

\[
\left( \frac{0.867 \text{ g}}{\text{cm}^3} \right) \left( \frac{\text{kg}}{1000 \text{ g}} \right) \left( \frac{100 \text{ cm}}{\text{m}} \right)^3 = \]

Answer: \(867 \text{ kg/m}^3\)

2. Check the correct answer. How many mm are in 1 km?
   - [ ] 10⁶ mm
   - [ ] 10³ mm
   - [x] 10⁶ mm
   - [ ] 10³ mm

3. Check the correct answer. How many ms are in 1 μs?
   - [ ] 10⁶ ms
   - [x] 10³ ms
   - [ ] 10⁶ ms
   - [ ] 10³ ms

4. Check the correct answer. The air in this room is an example of a:
   - [x] homogeneous mixture
   - [ ] heterogeneous mixture
   - [ ] compound
   - [ ] pure substance

5. The SI unit for mass is the \(\text{kilogram (kg)}\)

6. A car is travelling at 32 m/s. How fast is this in units of mi/h?
   Useful information: 1 min = 60 s; 60 min = 1 h; 1 mi = 1.609 km

\[
\left( \frac{32 \text{ m}}{\text{s}} \right) \left( \frac{\text{km}}{1000 \text{ m}} \right) \left( \frac{\text{mi}}{1.609 \text{ km}} \right) \left( \frac{60 \text{ s}}{\text{min}} \right) \left( \frac{60 \text{ min}}{1 \text{ h}} \right) = \]

Answer: \(72 \text{ mi/h}\)

(or \(71.6 \frac{\text{mi}}{\text{h}}\))