I. Questions: 5 points

Q1. The science of sound is called _______________.

Q2. The type of motion of the air molecules in a sound wave is called _______________ motion.

Q3. The most familiar sources of sound, including drumheads or a piano soundboard, are _______________ bodies.

Q4. Wave motion transports _______________ from one point in space to another.

Q5. Not all forms of sound are desirable. Unwanted sounds are often referred to as _______________.

II. Problems: 15 points

Convert the following to scientific notation:

P1. 2,758,000,000 = _______________.

P2. 557.3 = _______________.

P3. 0.112 = _______________.

P4. 0.000035 = _______________.

Do the following multiplication and division problems, leaving your answers in scientific notation:

P5. \((4 \times 10^4)/(5 \times 10^3)\) = _______________.

P6. \((2 \times 10^{-4})/(7 \times 10^{-7})\) = _______________.

P7. \((7.5 \times 10^7) \times (2.5 \times 10^3)\) = _______________.

P8. \((4 \times 10^{-2}) \times (3 \times 10^8)\) = _______________.

P9. A wading pool for kids is 25 feet long \((L)\), 15 feet wide \((W)\), and has a depth \((H)\) of 2.0 feet. The total volume \((V = L \times W \times H)\) of the water in the pool (in SI units) = _______________ m\(^3\).

P10. Since one liter \((1000\text{ cm}^3 = 1.0 \times 10^{-3}\text{ m}^3)\) of water has a mass of 1.0 kg, the density (= mass/volume) of water is 1.0 \times 10^3\text{ kg/m}^3 or 1000\text{ kg/m}^3. The total mass \((M = \text{volume} \times \text{density})\) of the water in a wading pool with a volume of 20.0 m\(^3\) = _______________ kg.
Suppose our lecture hall in Swain West is the origin \((x=0, y=0)\) of a 2-dimensional, rectangular coordinate frame. Let \(x\) be the distance east and \(y\) be the distance north, as on a map, and use kilometers as the unit of distance. Our best estimate for the coordinates \((x, y)\) of the IU Auditorium is \((0.60 \text{ km}, 0.40 \text{ km})\).

P11. The shortest distance (i.e., as the crow flies) between the two buildings = \[\text{______________ km}\].

P12. To walk this distance at a speed of \(1.20 \text{ m/s}\) takes a time \((t = \text{distance}/\text{speed}) = \[\text{_______ minutes}\].

You have just purchased a new Volkswagen Beetle. At a cruising speed of 65 miles per hour, it has an impressive fuel economy of 42 miles per gallon or 18 km/liter in SI units (1 gallon = 3.78 liters). Answer the following questions about the new Beetle.

P13. The average cruising speed (in SI units) = \[\text{______________ m/s}\].

P14. The number of gallons \((n)\) of gasoline needed to travel \(450 \text{ miles}\) = \[\text{______________ gal}\].

P15. The time \((t)\) required to cover \(450 \text{ miles}\) = \[\text{______________ hours}\].