PY 103 **Scientific Measurement WS 1.1**

Scientific Notation

Express the following in scientific notation:

1. $156.72 = ¿$ _____
2. $2004.32 = ¿$ _____
3. $0.0051 = ¿$ _____
4. $-18.42 = ¿$ _____
5. $-0.00007 = ¿$ _____
6. $7420000 = ¿$ _____

Solve the following and express the answer also in scientific notation:

7. $1 \div 10^{4} = ¿$ _____
8. $147 \times 10^{-5} = ¿$ _____
9. $8 \div \left(2 \times 10^{2}\right) = ¿$ _____
10. $\left(3 \times 10^{3}\right) \times \left(4 \times 10^{2}\right) = ¿$ _____
11. $\left(1.54 \times 10^{4}\right) + \left(7.3 \times 10^{5}\right) = ¿$ _____
12. $\left(2.7\,4 \times 10^{7}\right) - \left(8.9 \times 10^{6}\right) = ¿$ _____
13. $\left(6 \times 10^{5}\right) \times \left(8 \times 10^{-2}\right) = ¿$ _____
14. $\left(2.8 \times 10^{-3}\right) \div \left(4 \times 10^{2}\right) = ¿$ _____

Unit Conversion

14. 1 mm = _____ m
15. 1 MHz = _____ Hz
16. 1 g^2 = _____ kg^2
17. 1 m = _____ nm
18. How many mg are in 8.13 g?
19. How many liters are in 23.4 ml?
20. How many nm are in 2.5 mm?
21. 1.3 m^3 = _____ in^3

22. 1 km/h = _____ m/s

Significant Figures

23. How many significant figures does each of the following numbers have?

a. 15.78

b. -8.402

c. 0.000105

d. .0032

e. 6×10^4

f. 4.327×10^{-3}

24. Do the following arithmetic operations and give the answer to the correct significant figures.

a. $6.7 \times 4.62 = ¿$_____

b. $52.0 \times 3.7 = ¿$_____

c. $47.2 + 3.74 = ¿$_____

d. $8.76 - 2.2 = ¿$_____

e. $7.6 \div 4.62 = ¿$_____

f. $1.42 \div 0.007 = ¿$_____

g. $\sqrt{8.42}$ = _____

h. $(2.567 \times 10.6) - 1.48 = ¿$ _____

i. $(13.1 \times 5.4) + 69.6 = ¿$ _____

25. The area of the floor of a room is 192.4 ft^2. Express the volume of the room to the correct significant figure if its height is 8.1 ft.

26. The area of a tract of land is $1.2 \times 10^4 m^2$. If it is to be divided equally between nine people, what will be area of the plot that each person will receive? (Express the area to the correct significant figure.)

27. The frequency f of a wave is given by the formula:

$f = \frac{v}{\lambda}$, where v is the velocity and λ is the wavelength of the wave.

What is the frequency of red light if its wavelength is approximately 600 nm? (Velocity of light is 3×10^8 m/s.)

Estimation

(For the following, make an estimate of the dimension in British units and convert it to SI units.)

28. The average height of a man in the US is:
    a. 100 cm b. 175 cm c. 300 cm d. 400 cm

    Estimate: Height = _____ inches.

29. The speed limit on most US highways is about:
    a. 30 m/s b. 60 m/s c. 100 m/s d. 150 m/s

    Estimate: _____

30. The average weight of a woman in the US is about:
    a. 120 kg b. 90 kg c. 60 kg d. 30 kg

    Estimate: _____

31. The mass of the Earth is about _____ times the mass of the Sun.
    a. 10^{-2} b. 10^{-6} c. 10^{-12} d. 10^{10}

32. The height of the ceiling of a room in a house is about:
    a. 0.5 m b. 1 m c. 3 m d. 10 m

    Estimate: _____