

CHEMISTRY

METRIC DIMENSIONAL ANALYSIS

1. Calculate the number of kilometers (km) there are in 105 meters (m).

$$\frac{105 \text{ m}}{1} \times \frac{1 \text{ km}}{1000 \text{ m}} = \boxed{0.105 \text{ km}}$$

2. A piece of property is found to be 499 decimeters (dm) long. What is the value of this length in centimeters (cm)?

$$\frac{499 \text{ dm}}{1} \times \frac{1 \text{ m}}{10 \text{ dm}} \times \frac{100 \text{ cm}}{1 \text{ m}} = \boxed{4990 \text{ cm}}$$

3. How many millimeters are there in 5.97×10^{-6} meters (m)?

$$\frac{5.97 \times 10^{-6} \text{ m}}{1} \times \frac{1000 \text{ mm}}{1 \text{ m}} = \boxed{5.97 \times 10^{-3} \text{ mm}}$$

4. A book is found to have a mass 0.6321 kilogram (kg). Calculate its mass in grams (g).

$$\frac{0.6321 \text{ kg}}{1} \times \frac{1000 \text{ g}}{1 \text{ kg}} = \boxed{632.1 \text{ g}}$$

5. Calculate the number of kilometers (km) there are in 1.549 micrometers (μm).

$$\frac{1.549 \mu\text{m}}{1} \times \frac{1 \text{ m}}{1 \times 10^6 \mu\text{m}} \times \frac{1 \text{ km}}{1000 \text{ m}} = \boxed{1.549 \times 10^{-9} \text{ km}}$$

6. How many decimeters (dm) are there in 8.06295 millimeters (mm)?

$$\frac{8.06295 \text{ mm}}{1} \times \frac{1 \text{ m}}{1000 \text{ mm}} \times \frac{10 \text{ dm}}{1 \text{ m}} = \boxed{0.0806295 \text{ dm}}$$

7. Calculate the number of centimeters (cm) there are in 6.245101 kilometers (km).

$$\frac{6.245101 \text{ km}}{1} \times \frac{1000 \text{ m}}{1 \text{ km}} \times \frac{100 \text{ cm}}{1 \text{ m}} = \boxed{6.245101 \times 10^5 \text{ cm}}$$

8. How many meters (m) are there in 0.0031 kilometer (km)?

$$\frac{0.0031 \text{ km}}{1} \times \frac{1000 \text{ m}}{1 \text{ km}} = \boxed{3.1 \text{ m}}$$

9. A very small object is found to have a length of 3.44×10^{-4} meter (m). Express this length in micrometers (μm).

$$\frac{3.44 \times 10^{-4} \text{ m}}{1} \times \frac{1 \times 10^6 \mu\text{m}}{1 \text{ m}} = \boxed{344 \mu\text{m}}$$

10. Calculate the number of milligrams (mg) there are in 10.00 kilograms (kg).

$$\frac{10.00 \text{ kg}}{1} \times \frac{1000 \text{ g}}{1 \text{ kg}} \times \frac{1000 \text{ mg}}{1 \text{ g}} = \boxed{1.000 \times 10^7 \text{ mg}}$$

11. How many decigrams (dg) are there in 0.822 microgram (μg)?

$$\frac{0.822 \mu\text{g}}{1} \times \frac{1\text{g}}{1 \times 10^6 \mu\text{g}} \times \frac{10\text{dg}}{1\text{g}} = \boxed{8.22 \times 10^{-6} \text{dg}}$$

12. Calculate the number of kilograms (kg) in 7.66×10^5 grams (g).

$$\frac{7.66 \times 10^5 \text{g}}{1} \times \frac{1\text{kg}}{1000\text{g}} = \boxed{766 \text{g}}$$

13. How many kilograms (kg) are there in 2.023×10^3 milligram (mg)?

$$\frac{2.023 \times 10^3 \text{mg}}{1} \times \frac{1\text{g}}{1000\text{mg}} \times \frac{1\text{kg}}{1000\text{g}} = \boxed{2.023 \times 10^{-3} \text{kg}}$$

14. Calculate the number of micrograms (μg) in 0.000311 gram (g).

$$\frac{0.000311\text{g}}{1} \times \frac{1 \times 10^6 \mu\text{g}}{1\text{g}} = \boxed{311 \mu\text{g}}$$

15. Calculate the number of milligrams (mg) in 6.2×10^4 micrograms (μg).

$$\frac{6.2 \times 10^4 \mu\text{g}}{1} \times \frac{1\text{g}}{1 \times 10^6 \mu\text{g}} \times \frac{1000\text{mg}}{1\text{g}} = \boxed{62 \text{mg}}$$

16. How many meters (m) are there in 4312 centimeters (cm)?

$$\frac{4312 \text{cm}}{1} \times \frac{1\text{m}}{100\text{cm}} = \boxed{43.12 \text{m}}$$

17. How many decimeters (dm) are there in 1.733×10^5 meters (m)?

$$\frac{1.733 \times 10^5 \text{m}}{1} \times \frac{10\text{dm}}{1\text{m}} = \boxed{1.733 \times 10^6 \text{dm}}$$

18. Calculate the number of centimeters (cm) in 16 meters (m).

$$\frac{16\text{m}}{1} \times \frac{100\text{cm}}{1\text{m}} = \boxed{1.6 \times 10^3 \text{cm}}$$

19. The length of a sample of lead is found to be 86.3 centimeters (cm). What is the length of the sample in millimeters (mm)?

$$\frac{86.3 \text{cm}}{1} \times \frac{1\text{m}}{100\text{cm}} \times \frac{1000\text{mm}}{1\text{m}} = \boxed{863 \text{mm}}$$

20. How many kilometers (km) are there in 4.261×10^4 meters (m)?

$$\frac{4.261 \times 10^4 \text{m}}{1} \times \frac{1\text{km}}{1000\text{m}} = \boxed{42.61 \text{km}}$$