KEY

Unit Conversions – Solutions

1.) Convert a speed of $88\frac{m}{s}$ to its equivalent measurement in $\frac{cm}{s}$.

Answer - $\frac{88\ m}{1\ s} \times \frac{100\ cm}{1\ m} = \frac{8800\ cm}{s}$ $\frac{8800\ cm}{s}$

2.) Convert a density of $\frac{9.45\ g}{L}$ to its equivalence in $\frac{g}{mL}$.

Answer - $\frac{9.45\ g}{1\ L} \times \frac{1\ L}{1000\ mL} = \frac{0.00945\ g}{mL}$ $\frac{0.00945\ g}{mL}$

3.) The density of mercury metal is $\frac{13.6\ g}{mL}$. What is the mass of $3.55\ mL$ of the metal?

Answer - $3.55\ mL \times \frac{13.6\ g}{1\ mL} = 48.28\ g$ $48.3\ g$

4.) The density of salt is $\frac{2.16\ g}{mL}$. What is the mass of $100\ mL$ of this solid?

Answer - $100\ mL \times \frac{2.16\ g}{1\ mL} = 216\ g$ $200\ g$

5.) A particle moves through a gas at a speed of $\frac{15\ km}{s}$. How far will it move in $5.5\ s$?

Answer - $5.5\ s \times \frac{15\ km}{1\ s} = 82.5\ km$ $83\ km$

6.) A solution of barium nitrate contains $\frac{61.2\ g}{L}$ of solution. How many grams of barium nitrate is contained in $2.75\ L$ of this solution?

Answer - $2.75\ L \times \frac{61.2\ g}{1\ L} = 168.3\ g$ $168\ g$

7.) A sample of seawater contains $0.00245\ g$ of sodium chloride per mL of solution. How much sodium chloride is contained in $50.0\ mL$ of this solution?

Answer - $50.0\ mL \times \frac{0.00245\ g}{1\ mL} = 0.1225\ g$ $0.123\ g$

8.) Convert $\frac{73.4\ km}{h}$ to ite equivalent value in $\frac{m}{s}$.

Answer - $\frac{73.4\ km}{1\ h} \times \frac{1000\ m}{1\ km} \times \frac{1\ h}{60\ min} \times \frac{1\ min}{60\ s} = \frac{20.3888888\ km}{h}$ $\frac{20.4\ m}{s}$

9.) The density of iron is $\frac{7.86\ g}{mL}$. What volume will be occupied by $45.0\ g$?

Answer - $45.0\ g \times \frac{1\ mL}{7.86\ g} = 5.73\ mL$ $5.73\ mL$

10.) The density of helium gas is $\frac{0.178\ g}{L}$. What would be the mass of $150\ L$ of the gas?

Answer - $150\ L \times \frac{0.178\ g}{1\ L} = 26.7\ g$ $27\ g$

11.) A particle moving through a gas at a speed of $\frac{45.8\ m}{s}$ will take how long to travel $25\ cm$?

Answer - $25\ cm \times \frac{1\ m}{100\ cm} \times \frac{1\ s}{45.8\ m} = 0.00545851\ s$ $0.0055\ s$

12.) A sample of seawater contains $6.277\ g$ of sodium chloride per litre of solution. How many mg of sodium chloride would be contained in $25.0\ mL$ of this solution?

Answer - $25.0\ mL \times \frac{1}{1000\ mL} \times \frac{6.277\ g}{1\ L} \times \frac{1000\ mg}{1\ g} = 156.925\ mg$ $157\ mg$

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13.) Convert $32.5\ ounces$ to centigrams cg.

Answer - $32.5\ oz \times \frac{1\ lb}{16\ oz} \times \frac{454\ g}{1\ lb} \times \frac{100\ cg}{1\ g} = 92218.75\ cg$ $92200\ cg$

14.) Convert $3.55\ yards$ to cm.

Answer - $355\ yd \times \frac{36\ in}{1\ yd} \times \frac{2.54\ cm}{1\ in} = 324.612\ cm$ $325\ cm$

15.) Convert $35.8\ miles\ per\ hour\ (mph)$ to $\frac{m}{s}$.

Answer - $\frac{35.8\ mile}{1\ h} \times \frac{1\ km}{0.621\ mile} \times \frac{1000\ m}{1\ km} \times \frac{1\ h}{60\ min} \times \frac{1\ min}{60\ s} = \frac{16.0135989\ m}{s}$ $\frac{16.0\ m}{s}$

16.) Convert $\frac{13.6\ g}{mL}$ to pounds per cubic foot $(\frac{lb}{ft^3})$.

Answer - $\frac{13.6\ g}{1\ mL} \times \frac{1\ lb}{454\ g} \times \frac{1000\ mL}{1\ L} \times \frac{28.32\ L}{1\ ft^3} = \frac{848.3524\ lb}{ft^3}$ $\frac{848\ lb}{ft^3}$

17.) A sample of seawater contains $0.075\ g$ of sodium chloride per mL of solution. How many moles of sodium chloride are there per litre of this solution? A mole of sodium chloride is equivalent to $58.5\ g$ of sodium chloride.

Answer - $\frac{0.075\ g\ NaCl}{1\ mL} \times \frac{1\ mol}{58.5\ g} \times \frac{1000\ mL}{1\ L} = \frac{1.28205\ mol}{L}$ $\frac{1.3\ mol}{L}$