

ALLIGATIONS MASTERY PROBLEM ANSWERS

MASTERY PROBLEM 1

How many milliliters of normal saline, a diluent, must be added to one fluid ounce of 1% Phenylephrine HCl solution to reduce the strength to 0.67%?

Answer

Remember, Normal Saline is a diluent and therefore has a strength of 0%.

$$\begin{array}{r} 1 \qquad \qquad 0.67 \\ \qquad 0.67 \\ 0 \qquad \qquad 0.33 \qquad \qquad 9.9 \text{ mL} \\ \hline \qquad \qquad \qquad 1 \end{array}$$

You will need to use the conversion factor 1 fl. oz. = 30 mL to convert 1 fl.oz to milliliters. Use the equation Parts of lower strength/Total number of parts x Final required volume to determine how much NaCl is needed.

$$0.33/1 \times 30 \text{ mL} = 9.9 \text{ mL of NaCl}$$

MASTERY PROBLEM 2

How many milliliters of water should be added to 6 gallons of 91% Isopropyl Alcohol to create a diluted 70% Isopropyl Alcohol?

Answer

Remember, water is a diluent and therefore has a strength of 0%. Use correct units of measure. Round to the tenths.

$$\begin{array}{r} 91 \qquad \qquad 70 \\ \qquad 70 \\ 0 \qquad \qquad 21 \qquad \qquad 5,316.9 \text{ mL} \\ \hline \qquad \qquad \qquad 91 \end{array}$$

You will need to convert 6 gallons (final required volume) into milliliters first using conversion factor 1 gal = 3840 mL. Then use the equation Parts of lower strength/Total number of parts x final required volume to determine how much water is needed.

$$21/91 \times 23,040 \text{ mL} = 5,316.9 \text{ mL of Water}$$

MASTERY PROBLEM 3

How many grams of cream base must be added to 1% pimecrolimus cream to make 1 pound of a 0.75% ointment?

Answer

Remember, cream base is a diluent and therefore has a strength of 0%. Solve for the amount of cream base, needed. Use correct units of measure. Round to the tenths.

$$\begin{array}{r} 1 \quad \quad 0.75 \\ \quad 0.75 \\ 0 \quad \quad 0.25 \\ \hline \quad \quad 1 \end{array} \quad 113.5 \text{ g}$$

You will need to use the conversion factor 1 lb = 454 g to convert the final required volume of 1 lb to grams. Then use the equation Parts of lower strength/Total number of parts x final required volume to determine how much cream base is needed.

$$0.25/1 \times 454 \text{ g} = 113.5 \text{ g of Cream Base}$$

MASTERY PROBLEM 4

The pharmacy receives an order for 0.5L of D₁₀W. Using D₅W and D₅₀W. How many milliliters of each will be needed to prepare this order?

Answer

In this problem, the higher strength is D₅₀W (50% dextrose in water) and the lower strength is D₅W (5% dextrose in water). Solve for the amount of D₅₀W, needed. Use correct units of measure. Round to the tenths.

$$\begin{array}{r} 50 \quad \quad 5 \quad \quad 55.6 \text{ mL} \\ \quad 10 \\ 5 \quad \quad 40 \\ \hline \quad \quad 45 \end{array}$$

You will need to convert 0.5 L (final required volume) to milliliters first using the equivalent 1 L = 1000 mL. Then use the equation Parts of higher strength/Total number of parts x final required volume to determine how much D₅₀W is needed.

$$5/45 \times 500 \text{ mL} = 55.6 \text{ mL of D}_{50}\text{W}$$

Solve for the amount of D₅W, needed. Use correct units of measure. Round to the tenths.

$$\begin{array}{r}
 50 \qquad 5 \\
 5 \qquad 10 \qquad 40 \\
 \hline
 \qquad \qquad 45
 \end{array}
 \qquad 444.4 \text{ mL}$$

Use the equation Parts of the lower strength/Total number of parts x final required volume to determine how much D₅W is needed.

$$40/45 \times 500 \text{ mL} = 444.4 \text{ mL of D}_5\text{W}$$

MASTERY PROBLEM 5

How many milliliters of distilled water must be added to a 5% solution of potassium chloride to make one and a half liters of a 0.2% solution?

Answer

Remember, distilled water is a diluent and therefore has strength of 0%. Solve for the amount of distilled water needed. Use correct units of measure.

$$\begin{array}{r}
 5 \qquad 0.2 \\
 0 \qquad 0.2 \qquad 4.8 \\
 \hline
 \qquad \qquad 5
 \end{array}
 \qquad 1,440 \text{ mL}$$

You will first have to convert the final required volume of 1.5 L using equivalent 1 L = 1000 mL. Then use equation Parts of lower strength/Total number of parts x final required volume to determine how much distilled water is needed.

$$4.8/5 \times 1,500 \text{ mL} = 1,440 \text{ mL of Distilled Water}$$

MASTERY PROBLEM 6

How many grams of coal tar should be added to 6 pounds of 20% coal tar ointment to prepare an ointment containing 40% coal tar?

Answer

Remember, coal tar is a pure product and therefore has a strength of 100%. Solve for the amount of coal tar needed. Use correct units of measure.

$$8/20 \times 480 \text{ mL} = 192 \text{ mL of } 0.9\% \text{ NaCl}''$$

MASTERY PROBLEM 8

Prepare 3 gallons of 5% hydrogen peroxide (H₂O₂) solution using 30% hydrogen peroxide (H₂O₂) and 1.5% hydrogen peroxide (H₂O₂) solutions. How many milliliters of each are needed?

Answer

Your higher strength is the 30% hydrogen peroxide and the lower strength is the 1.5% hydrogen peroxide.

Solve for the amount of 30% hydrogen peroxide, needed. Use correct units of measure. Round to the tenths.

$$\begin{array}{r} 30 \quad 5 \quad 3.5 \quad 1414.7 \text{ mL} \\ 1.5 \quad 25 \\ \hline 28.5 \end{array}$$

You will first have to convert the final required volume of 3 gallons to milliliters using the conversion factor 1 gal = 3840 mL. Then use equation

Parts of higher strength/Total number of parts x final required volume to determine how much 30% hydrogen peroxide is needed.

$$3.5/28.5 \times 11,520 \text{ mL} = 1,414.7 \text{ mL of } 30\% \text{ Hydrogen Peroxide}''$$

Solve for the amount of 1.5% hydrogen peroxide, needed. Use correct units of measure. Round to the tenths.

$$\begin{array}{r} 30 \quad 5 \quad 3.5 \\ 1.5 \quad 25 \quad 10,105.3 \text{ mL} \\ \hline 28.5 \end{array}$$

Use equation Parts of lower strength/Total number of parts x final required volume to determine how much 1.5% hydrogen peroxide is needed.

$$25/28.5 \times 11,520 \text{ mL} = 10,105.3 \text{ mL of } 1.5\% \text{ Hydrogen Peroxide}$$

MASTERY PROBLEM 9

A medication order for 1 L 18% NaCl in D₅W, 125ml/hr for 3 days is received in the pharmacy. To prepare the order, the pharmacy has 23.4% concentrated NaCl in stock and D₅W. How many milliliters of each are needed to prepare one bag?

Answer

Your higher strength is the 23.4% concentrated NaCl and the lower strength is the D₅W which is acting as a diluent.

Solve for the amount of 23.4% concentrated NaCl needed. Use correct units of measure. Round to the tenths.

$$\begin{array}{r} 23.4 \quad 18 \quad 769.2 \text{ mL} \\ 0 \quad 18 \quad 5.4 \\ \hline \quad \quad 23.4 \end{array}$$

You will first have to convert the final required volume of 1 L to milliliters using the conversion factor 1 L = 1000 mL. Then use equation Parts of higher strength/Total number of parts x final required volume to determine how much 23.4% concentrated NaCl.

$$18/23.4 \times 1,000 \text{ mL} = 769.2\text{mL of } 23.4\% \text{ concentrated NaCl}$$

Solve for the amount of D₅W needed. Use correct units of measure. Round to the tenths.

$$\begin{array}{r} 23.4 \quad 18 \\ 0 \quad 18 \quad 5.4 \quad 230.8 \text{ mL} \\ \hline \quad \quad 23.4 \end{array}$$

Use equation Parts of lower strength/Total number of parts x final required volume to determine how much D₅W is needed.

$$5.4/23.4 \times 1,000 \text{ mL} = 230.8 \text{ mL of D}_5\text{W}$$

MASTERY PROBLEM 10

How many grams of 25% Zinc Oxide Paste and 3% Zinc Oxide Paste are needed to prepare 240 g of 15% Zinc Oxide Paste?

Answer

Your higher strength is the 25% Zinc Oxide Paste and the lower strength is the 3% Zinc Oxide Strength.

Solve for the amount of 25% Zinc Oxide Paste needed. Use correct units of measure. Round to the tenths.

$$\begin{array}{r}
 25 \quad \quad 12 \quad 130.9 \text{ g} \\
 \quad 15 \quad \quad \quad \quad \\
 3 \quad \quad \quad 10 \\
 \quad \quad \quad \text{----} \\
 \quad \quad \quad 22
 \end{array}$$

Use equation Parts of higher strength/Total number of parts x final required volume to determine how much 25% Zinc Oxide Paste is needed.

$$12/22 \times 240 \text{ g} = 130.9 \text{ g of 25\% Zinc Oxide Paste}''$$

Solve for the amount of 3% Zinc Oxide Paste needed. Use correct units of measure. Round to the tenths.

$$\begin{array}{r}
 25 \quad \quad 12 \\
 \quad 15 \quad \quad \quad \quad \\
 3 \quad \quad \quad 10 \quad 109.1 \text{ g} \\
 \quad \quad \quad \text{----} \\
 \quad \quad \quad 22
 \end{array}$$

Use equation Parts of lower strength/Total number of parts x final required volume to determine how much D₅W is needed.

$$10/22 \times 240 \text{ g} = 109.1 \text{ g of 3\% Zinc Oxide Paste}$$