How would you prepare 400 mL of a 0.85 M NaCl (sodium chloride) solution?

How would you prepare 250 mL of a 0.75 M $C_6H_{12}O_6$ (glucose) solution?

Prepare 375 mL of a 0.34 M NaCl (sodium chloride) solution.

Prepare 180 mL of a 1.2 M $C_6H_{12}O_6$ (glucose) solution.

Prepare a 0.23 M NaCl solution, given 4.5 g of NaCl (sodium chloride).

Prepare a 0.65 M glucose solution using 5.85 g of $C_6H_{12}O_6$ (glucose).

How would you prepare a 0.5 M NaCl solution using 2.5 kg of NaCl (sodium chloride)?

You have 0.15 kg of glucose. How would you prepare a 0.25 M $C_6H_{12}O_6$ (glucose) solution?

What is the molarity of a solution prepared by dissolving 12.5 g of $CaCl_2$ (calcium chloride) in 500 mL of solution?

How would you prepare 400 mL of a 0.85 M NaCl (sodium chloride) solution?

$$NaCl = (Na) + (Cl) = (22.9898) + (35.453) = 58.443 \ g/mole$$

$$0.85\ M = 0.85 \frac{moles}{L}\left(58.443 \frac{g}{mole}\right) = 49.68 \frac{g}{L}$$

$$C = \frac{m_{NaCl}}{V_{total}}$$

$$49.68 \frac{g}{L} = \frac{m_{NaCl}}{400\ mL}$$

$$\frac{49.68\ g}{1\ L} = \frac{m_{NaCl}}{400\ mL}$$

$$m_{NaCl} = \frac{(49.68\ g)(400\ mL)}{1\ L}\left(\frac{1\ L}{1000\ mL}\right)$$

$$m_{NaCl} = 19.87\ g$$

$$\boxed{m_{NaCl} = 20\ g}$$

How would you prepare 250 mL of a 0.75 M $C_6H_{12}O_6$ (glucose) solution?

$$C_6H_{12}O_6 = 6(C) + 12(H) + 6(O) = 6(12.0107) + 12(1.008) + 6(15.999)$$
$$= 180.154 \ g/mole$$

$$0.75 \ M = 0.75 \ \frac{mole}{L}\left(180.154 \ \frac{g}{mole}\right) = 135.12 \ \frac{g}{L}$$

$$C = \frac{m_{C_6H_{12}O_6}}{\forall_{total}}$$

$$135.12 \ \frac{g}{L} = \frac{m_{C_6H_{12}O_6}}{250 \ mL}$$

$$\frac{135.12 \ g}{1 \ L} = \frac{m_{C_6H_{12}O_6}}{250 \ mL}$$

$$m_{C_6H_{12}O_6} = \frac{(135.12 \ g)(250 \ mL)}{1 \ L}\left(\frac{1 \ L}{1000 \ mL}\right)$$

$$m_{C_6H_{12}O_6} = 33.78 \ g$$

$$\boxed{m_{C_6H_{12}O_6} = 34 \ g}$$

Prepare 375 mL of a 0.34 M NaCl (sodium chloride) solution.

$$NaCl = (Na) + (Cl) = (22.9898) + (35.453) = 58.443 \ g/mole$$

$$0.34\ M = 0.34 \ \frac{mole}{L}\left(58.443 \ \frac{g}{mole}\right) = 19.87 \ \frac{g}{L}$$

$$C = \frac{m_{NaCl}}{V_{total}}$$

$$19.87 \ \frac{g}{L} = \frac{m_{NaCl}}{375\ mL}$$

$$\frac{19.87\ g}{1\ L} = \frac{m_{NaCl}}{375\ mL}$$

$$m_{NaCl} = \frac{(19.87\ g)(375\ mL)}{1\ L}\left(\frac{1\ L}{1000\ mL}\right)$$

$$m_{NaCl} = 7.451\ g$$

$$\boxed{m_{NaCl} = 7.5\ g}$$

Prepare 180 mL of a 1.2 M $C_6H_{12}O_6$ (glucose) solution.

$$C_6H_{12}O_6 = 6(C) + 12(H) + 6(O) = 6(12.0107) + 12(1.008) + 6(15.999)$$
$$= 180.154 \ \frac{g}{mole}$$

$$1.2\ M = 1.2 \ \frac{moles}{L}\left(180.154 \ \frac{g}{mole}\right) = 216.185 \ \frac{g}{L}$$

$$C = \frac{m_{C_6H_{12}O_6}}{\forall_{total}}$$

$$216.185 \ \frac{g}{L} = \frac{m_{C_6H_{12}O_6}}{180\ mL}$$

$$\frac{216.185\ g}{1\ L} = \frac{m_{C_6H_{12}O_6}}{180\ mL}$$

$$m_{C_6H_{12}O_6} = \frac{(216.185\ g)(180\ mL)}{1\ L}\left(\frac{1\ L}{1000\ mL}\right)$$

$$m_{C_6H_{12}O_6} = 38.9133\ g$$

$$\boxed{m_{C_6H_{12}O_6} = 39\ g}$$

Prepare a 0.23 M NaCl solution, given 4.5 g of NaCl (sodium chloride).

$$NaCl = (Na) + (Cl) = (22.9898) + (35.453) = 58.443 \ \frac{g}{mole}$$

$$0.23\ M = 0.23 \ \frac{\cancel{moles}}{L}\left(58.443 \ \frac{g}{\cancel{mole}}\right) = 13.44 \ \frac{g}{L}$$

$$C = \frac{m_{NaCl}}{\forall_{total}}$$

$$13.44 \ \frac{g}{L} = \frac{4.5\ g}{\forall_{total}}$$

$$\frac{13.44\ g}{1\ L} = \frac{4.5\ g}{\forall_{total}}$$

$$\forall_{total} = \frac{(\cancel{1L})(\cancel{4.5g})}{\cancel{13.44g}}\left(\frac{1000\ mL}{\cancel{1L}}\right)$$

$$\forall_{total} = 334.82\ mL$$

$$\boxed{\forall_{total} = 330\ mL}$$

Prepare a 0.65 M glucose solution using 5.85 g of $C_6H_{12}O_6$ (glucose).

$$C_6H_{12}O_6 = 6(C) + 12(H) + 6(O) = 6(12.0107) + 12(1.008) + 6(15.999)$$
$$= 180.154 \ g/mole$$

$$0.65\ M = 0.65 \ \frac{mole}{L}\left(180.154 \ \frac{g}{mole}\right) = 117.10 \ \frac{g}{L}$$

$$C = \frac{m_{C_6H_{12}O_6}}{\forall_{total}}$$

$$117.10 \ \frac{g}{L} = \frac{5.85\ g}{\forall_{total}}$$

$$\frac{117.10\ g}{1L} = \frac{5.85\ g}{\forall_{total}}$$

$$\forall_{total} = \frac{(1L)(5.85\ g)}{117.10\ g}\left(\frac{1000\ mL}{1L}\right)$$

$$\forall_{total} = 49.957\ mL$$

$$\boxed{\forall_{total} = 5.0 \times 10^{1}\ mL}$$

How would you prepare a 0.5 M NaCl solution using 2.5 kg of NaCl (sodium chloride)?

$$NaCl = (Na) + (Cl) = (22.9898) + (35.453) = 58.443\ g/mole$$

$$0.5M = 0.5\ \frac{mole}{L}\left(58.443\ \frac{g}{mole}\right) = 29.22\ \frac{g}{L}$$

$$C = \frac{m_{NaCl}}{\forall_{total}}$$

$$29.22\ \frac{g}{L} = \frac{2.5\ kg}{\forall_{total}}$$

$$\frac{29.22\ g}{1\ L} = \frac{2.5\ kg}{\forall_{total}}$$

$$\forall_{total} = \frac{(1\ L)(2.5\ kg)}{29.22\ g}\left(\frac{1000\ g}{1\ kg}\right)$$

$$\forall_{total} = 85.56\ L$$

$$\boxed{\forall_{total} = 90\ L}$$

You have 0.15 kg of glucose. How would you prepare a 0.25 M $C_6H_{12}O_6$ (glucose) solution?

$$C_6H_{12}O_6 = 6(C) + 12(H) + 6(O) = 6(12.0107) + 12(1.008) + 6(15.999)$$
$$= 180.154 \ g/mole$$

$$0.25\ M = 0.25 \ \frac{moles}{L}\left(180.154 \ \frac{g}{mole}\right) = 45.039 \ \frac{g}{L}$$

$$C = \frac{m_{glucose}}{\forall_{total}}$$

$$45.039 \ \frac{g}{L} = \frac{0.15\ kg}{\forall_{total}}$$

$$\frac{45.039\ g}{1L} = \frac{0.15\ kg}{\forall_{total}}$$

$$\forall_{total} = \frac{(1L)(0.15\ kg)}{45.039\ g}\left(\frac{1000\ g}{1\ kg}\right)$$

$$\forall_{total} = 3.33\ L$$

$$\boxed{\forall_{total} = 3.3\ L}$$

What is the molarity of a solution prepared by dissolving 12.5 g of $CaCl_2$ (calcium chloride) in 500 mL of solution?

$$CaCl_2 = (Ca) + 2(Cl) = (40.078) + 2(35.453)$$

$$= 110.984 \ g/mole$$

$$C = \frac{m_{CaCl_2}}{\forall_{total}}$$

$$= \frac{12.5\,g}{500\,mL}\left(\frac{1000\,mL}{1\,L}\right)$$

$$= 25 \ g/L \left(\frac{1}{110.984 \ g/mole}\right)$$

$$= 25 \ g/L \left(\frac{1}{110.984} \ \frac{mole}{g}\right)$$

$$= 0.225 \ \frac{mole}{L} = 0.225 \ M$$

$$\boxed{C = 0.2 \ M}$$