

Answers - Ch. 13

M ↔ m questions

13.55 calc m to
HNO₃ 16 M 1.42 g/mL

$$\frac{16 \text{ mol HNO}_3}{1 \text{ L solution}}$$

$$(16 \text{ mol}) \left(\frac{63.018 \text{ g}}{1 \text{ mol}} \right) = 1008.288 \text{ g HNO}_3 \text{ in 1 L soln}$$

$$(1000 \text{ mL soln}) \left(\frac{1.42 \text{ g solution}}{1 \text{ mL}} \right) = 1420 \text{ g solution in 1 L soln}$$

$$\begin{array}{r} 1420 \text{ g soln} \\ - 1008.288 \text{ g HNO}_3 \\ \hline 411.712 \text{ g water} \end{array}$$

$$\frac{16 \text{ mol HNO}_3}{0.411712 \text{ kg water}} = 38.86 \text{ m}$$

or 40 m

Additional prob

1.146 m KBr 1.10 g/mL soln

$$\frac{1.146 \text{ mol KBr}}{1 \text{ kg H}_2\text{O}}$$

$$(1.146 \text{ mol KBr}) \left(\frac{119.0 \text{ g KBr}}{1 \text{ mol KBr}} \right) = 136.374 \text{ g KBr}$$

$$\begin{array}{r} 1000 \text{ g H}_2\text{O} \\ + 136.374 \text{ g KBr} \\ \hline 1136.374 \text{ g solution} \end{array}$$

$$(1136.374 \text{ g soln}) \left(\frac{1 \text{ mL soln}}{1.10 \text{ g soln}} \right) = 1033.067 \text{ mL soln}$$

$$\frac{1.146 \text{ mol KBr}}{1.033067 \text{ L soln}} = 1.11 \text{ M}$$