Answer Key to Calculations-Lab I

Dilutions Series (p. 4):

Series A:
O.5mL/(0.5mL + 4.5mL) * 1.0mL/(1.0mL + 9.0mL) = 0.01 = **$1.0 * 10^{-2}$**

Series B:
0.1mL/(0.1mL + 9.9mL) = 0.01 = $1.0 * 10^{-2}$

Series C:
1.0mL/(1.0mL + 4.0mL) * 0.5mL/(0.5mL + 9.5mL) = 0.01 = **$1 * 10^{-2}$**

Series D:
1.0mL/(1.0mL + 3.0mL) * 0.5mL/(0.5mL + 12.0mL) = 0.01 = **10^{-2}**

Molarity Problems (p. 6):

How would you make 500mL of 1M NaCl?

→ Add 29.25g NaCl to 500mL water
58.5g NaCl/mol * 1M (mol/L)* 500mL * 1L/1000mL = 29.25g NaCl

How would you make 300mL of 2.5 M NaCl?

→ Add 43.88g NaCl to 300mL water
58.5g NaCl/mol * 2.5M (mol/L)* 300mL * 1L/1000mL = 43.88g NaCl

How would you make 100mL of 50mM NaCl?

→ Add $2.92 * 10^{-1}$g NaCl to 100mL water
58.5gNaCl/mol * 50mM * 1M/1000mM * 100mL * 1L/1000mL = $2.92 * 10^{-1}$g NaCl

Molarity problems (p. 7):

500mL of 50uM NaCl from 500mM NaCl?

→ Add 0.05mL stock solution to 499.95mL water
-Final concentration = 50uM * 1mM/1000uM = 0.05mM
-Dilution factor = 500mM/0.05mM = 10, 000
-Volume of stock sol'n used = 500mL/10,000 = 0.05mL

100mL 5mM NaCl, 1mM EDTA from 200mM NaCl and 100mM EDTA?

→ Add 2.5 mL NaCl stock and 1mL EDTA stock to 96.5 mL water
-Dilution factor NaCl = 200mM NaCl/5mM NaCl = 40

-Volume of Stock NaCl used = 100mL /40 = 2.5 mL
-Dilution Factor for EDTA = 100mM EDTA/1mM EDTA = 100
-Volume of stock EDTA used = 100mL/100 = 1mL

500mL 25mM NaCl, 10mM EDTA, 1.5mM $MgCl_2$ from 500mM NaCl, 500mM EDTA, 15mM $MgCl_2$?

→ Add 25mL NaCl stock, 10mL EDTA stock, and 50ml $MgCl_2$ stock to 415mL water
-Dilution Factor for NaCl = 500mM NaCl/25mM NaCl = 20
-Volume of Stock NaCl used = 500mL/20 = 25mL
-Dilution Factor for EDTA = 500mM EDTA/10mM EDTA = 50
-Volume of Stock EDTA used = 500mL/ 50 = 10mL
-Dilution factor for $MgCl_2$ = 15mM $MgCl_2$ / 1.5mM $MgCl_2$ = 10
-Volume of stock $MgCl_2$ used = 500mL/10 = 50mL