

The 0.1M means 0.1 mol in 1L. If you don't need 1L, but only 200 ml (0.2 L), the amount of substance is:

$$0.1 \text{ mol} * 0.2 \text{ L} / 1\text{L} = 0.02 \text{ mol}$$

If  $n = m/M_w$ , the m for NaCl is:

$$m = n * M_w = 0.02 \text{ mol} * 55.8 = 1.116 \text{ g of NaCl}$$

The mass of water is 200 g

If  $n = m/M_w$ , the m for Na<sub>2</sub>CO<sub>3</sub> is:

$$m = n * M_w = 0.02 \text{ mol} * 106 = 2.12 \text{ g of Na}_2\text{CO}_3$$

The mass of water is 200 g

The same with 250 ml of 0.2 N, but 0.2N is 0.2 M for NaCl and 0.4 for Na<sub>2</sub>CO<sub>3</sub> (because of CO<sub>3</sub><sup>2-</sup>)

For NaCl :

$$m = (0.2 * 0.250) * 55.8 = 2.79 \text{ g of NaCl and 250 g of water.}$$

For Na<sub>2</sub>CO<sub>3</sub>:

$$m = (0.2 * 0.250) * 106 = 5.3 \text{ g and 250 g of water.}$$

3% means that mass of solved compound is dissolved in 97% of solvent. Water is a solvent and its mass is 100 g, So if 100 g is 97%, 3% is 3.09 g. (For NaCl and Na<sub>2</sub>CO<sub>3</sub>).