$Zn + 2HCl \rightarrow ZnCl_2 + H_2$

$3 \text{ moles of } Zn \times \frac{1 \text{ moles of } H_2}{1 \text{ moles of } Zn} = \boxed{3 \text{ moles of } H_2}$

b)

$4L \text{ of } HCl \times \frac{1 \text{ mol}}{22.4 \text{ L of } HCl} = 0.18 \text{ mol of } HCl$

$0.18 \text{ mol of } HCl \times \frac{1 \text{ mol } ZnCl_2}{2 \text{ mol } HCl} = 0.09 \text{ mol of } ZnCl_2$

$0.09 \text{ mol of } ZnCl_2 \times \frac{22.4 \text{ L}}{1 \text{ mol}} = \boxed{2.0 \text{ L of } ZnCl_2}$

c)

$56g \times \frac{1 \text{ mol}}{65.39 \text{ g of } Zn} = 0.86 \text{ mol of } Zn$

$0.86 \text{ mol of } Zn \times \frac{2 \text{ mol } HCl}{1 \text{ mol } Zn} = 1.7 \text{ mol } HCl$

$1.7 \text{ mol } HCl \times \frac{36.45 \text{ g}}{1 \text{ mol } HCl} = \boxed{61.97 \text{ g of } HCl}$

d)

$30_g \text{ of } HCl \times \frac{1 \text{ mol of } HCl}{36.45 \text{ g of } HCl} = 0.82 \text{ mol of } HCl$

$0.82 \text{ mol of } HCl \times \frac{1 \text{ mol } H_2}{2 \text{ mol } HCl} = 0.41 \text{ mol of } H_2$

$0.41 \text{ mol of } H_2 \times \frac{22.4 \text{ L}}{1 \text{ mol of } H_2} = \boxed{9.2 \text{ L of } H_2}$

e)

$2 \text{ mol } ZnCl_2 \times \frac{1 \text{ Zn}}{1 \text{ } ZnCl_2} = 2 \text{ mol of Zn}$

$2 \text{ mol of Zn} \times \frac{6.02 \times 10^{23} \text{ molecules}}{1 \text{ mol of Zn}} = \boxed{1.2 \times 10^{24} \text{ molecules}}$