1) $NiCl_{2(aq)} + Ag_2SO_{4(aq)} \rightarrow NiSO_{4(aq)} + 2\ AgCl_{(s)}$

$$25.00\ g\ \mathbf{NiCl_2} \times \frac{1\ mol\ \mathbf{NiCl_2}}{129.62\ g\ \mathbf{NiCl_2}} \times \frac{1\ mol\ \mathbf{NiSO_4}}{1\ mol\ \mathbf{NiCl_2}} \times \frac{154.77\ g\ \mathbf{NiSO_4}}{1\ mol\ \mathbf{NiSO_4}} = 29.85\ g\ \mathbf{NiSO_4}$$

$$25.00\ g\ \mathbf{Ag_2SO_4} \times \frac{1\ mol\ \mathbf{Ag_2SO_4}}{311.799\ g\ \mathbf{Ag_2SO_4}} \times \frac{1\ mol\ \mathbf{NiSO_4}}{1\ mol\ \mathbf{Ag_2SO_4}} \times \frac{154.77\ g\ \mathbf{NiSO_4}}{1\ mol\ \mathbf{NiSO_4}} = \boxed{12.41\ g\ \mathbf{NiSO_4}}$$

12.41 g $NiSO_4$ can be made and Ag_2SO_4(is the L.R.

$NiCl_2$	$NiSO_4$ = 12.41 g
Ag_2SO_4 = 0 g	AgCl

$$25.00\ g\ \mathbf{Ag_2SO_4} \times \frac{1\ mol\ \mathbf{Ag_2SO_4}}{311.799\ g\ \mathbf{Ag_2SO_4}} \times \frac{2\ mol\ \mathbf{AgCl}}{1\ \mathbf{Ag_2SO_4}} \times \frac{143.323\ g\ \mathbf{AgCl}}{1\ mol\ \mathbf{AgCl}} = 22.98\ g\ \mathbf{AgCl}$$

$NiCl_2$	$NiSO_4$ = 12.41 g
Ag_2SO_4 = 0 g	AgCl = 22.98 g

$$25.00\ g\ \mathbf{Ag_2SO_4} \times \frac{1\ mol\ \mathbf{Ag_2SO_4}}{311.799\ g\ \mathbf{Ag_2SO_4}} \times \frac{1\ mol\ \mathbf{NiCl_2}}{1\ mol\ \mathbf{Ag_2SO_4}} \times \frac{129.62\ g\ \mathbf{NiCl_2}}{1\ mol\ \mathbf{NiCl_2}} = 10.34\ g\ \mathbf{NiCl_2}$$

25.00 g $NiCl_2$ (started) **– 10.34 g $NiCl_2$** (used) = **14.66 g $NiCl_2$ LEFT!**

$NiCl_2$ = 14.66 g	**$NiSO_4$ = 12.41 g**
Ag_2SO_4 = 0 g	**AgCl = 22.98 g**

2) $Li_3PO_{4(aq)} + 3\ AuC_2H_3O_{2(aq)} \rightarrow 3\ LiC_2H_3O_{2\ (aq)} + Au_3PO_{4(s)}$

This is NOT a limiting reactant problem, you were only given an amount of one reactant! I was checking to see if you were paying attention. You need only find how much of the 2 products can be made from the given mass of Li_3PO_4 (since no specific product was asked for)

$$18.9\ g\ \mathbf{Li_3PO_4} \times \frac{1\ mol\ \mathbf{Li_3PO_4}}{115.788\ g\ \mathbf{Li_3PO_4}} \times \frac{3\ mol\ \mathbf{LiC_2H_3O_2}}{1\ mol\ \mathbf{Li_3PO_4}} \times \frac{65.984\ g\ \mathbf{LiC_2H_3O_2}}{1\ mol\ \mathbf{LiC_2H_3O_2}} = \boxed{32.3\ g\ \mathbf{LiC_2H_3O_2}}$$

$$18.9\ g\ \mathbf{Li_3PO_4} \times \frac{1\ mol\ \mathbf{Li_3PO_4}}{115.788\ g\ \mathbf{Li_3PO_4}} \times \frac{1\ mol\ \mathbf{Au_3PO_4}}{1\ mol\ \mathbf{Li_3PO_4}} \times \frac{685.872\ g\ \mathbf{Au_3PO_4}}{1\ mol\ \mathbf{Au_3PO_4}} = \boxed{112\ g\ \mathbf{Au_3PO_4}}$$

3) $Cu(NO_3)_{2(aq)} + Na_2C_2O_{4(aq)} \rightarrow CuC_2O_{4(s)} + 2\ NaNO_{3(aq)}$

$$0.500\ g\ \mathbf{Cu(NO_3)_2} \times \frac{1\ mol\ \mathbf{Cu(NO_3)_2}}{187.55\ g\ \mathbf{Cu(NO_3)_2}} \times \frac{1\ mol\ \mathbf{CuC_2O_4}}{1\ mol\ \mathbf{Cu(NO_3)_2}} \times \frac{151.56\ g\ \mathbf{CuC_2O_4}}{1\ mol\ \mathbf{CuC_2O_4}} = \boxed{0.404\ g\ \mathbf{CuC_2O_4}}$$

$$1.25\ g\ \mathbf{Na_2C_2O_4} \times \frac{1\ mol\ \mathbf{Na_2C_2O_4}}{133.9996\ g\ \mathbf{Na_2C_2O_4}} \times \frac{1\ mol\ \mathbf{CuC_2O_4}}{1\ mol\ \mathbf{Na_2C_2O_4}} \times \frac{151.56\ g\ \mathbf{CuC_2O_4}}{1\ mol\ \mathbf{CuC_2O_4}} = 1.41\ g\ \mathbf{CuC_2O_4}$$

0.404 g CuC_2O_4 can be made and $Cu(NO_3)_2$ is the L.R.

$Cu(NO_3)_2$ = 0 g	CuC_2O_4 = 0.404 g
$Na_2C_2O_4$	$NaNO_3$

$$0.500\ g\ \mathbf{Cu(NO_3)_2} \times \frac{1\ mol\ \mathbf{Cu(NO_3)_2}}{187.55\ g\ \mathbf{Cu(NO_3)_2}} \times \frac{2\ mol\ \mathbf{NaNO_3}}{1\ mol\ \mathbf{Cu(NO_3)_2}} \times \frac{84.9947\ g\ \mathbf{NaNO_3}}{1\ mol\ \mathbf{NaNO_3}} = 0.453\ g\ \mathbf{NaNO_3}$$

$Cu(NO_3)_2$ = 0 g	CuC_2O_4 = 0.404 g
$Na_2C_2O_4$	$NaNO_3$ = 0.453 g

$$0.500\ g\ \mathbf{Cu(NO_3)_2} \times \frac{1\ mol\ \mathbf{Cu(NO_3)_2}}{187.55\ g\ \mathbf{Cu(NO_3)_2}} \times \frac{1\ mol\ \mathbf{NaC_2O_4}}{1\ mol\ \mathbf{Cu(NO_3)_2}} \times \frac{84.9947\ g\ \mathbf{NaC_2O_4}}{1\ mol\ \mathbf{NaC_2O_4}} = 0.227\ g\ \mathbf{NaC_2O_4}$$

1.25 g $Na_2C_2O_4$ (started) **– 0.227 g $Na_2C_2O_4$** (used) = **1.02 g $Na_2C_2O_4$ LEFT!**

$Cu(NO_3)_2$ = 0 g	**CuC_2O_4 = 0.404 g**
$Na_2C_2O_4$ = 1.02 g	**$NaNO_3$ = 0.453 g**

4) $H_2SO_{4(aq)} + SrBr_{2(aq)} \rightarrow SrSO_{4(s)} + 2\ HBr_{(aq)}$

$$0.525\ L\ \mathbf{solution} \times \frac{1.199\ mol\ \mathbf{H_2SO_4}}{1\ L\ \mathbf{solution}} \times \frac{1\ mol\ \mathbf{SrSO_4}}{1\ mol\ \mathbf{H_2SO_4}} \times \frac{183.68\ g\ \mathbf{SrSO_4}}{1\ mol\ \mathbf{SrSO_4}} = 116\ g\ \mathbf{SrSO_4}$$

$$23.66\ g\ \mathbf{SrBr_2} \times \frac{1\ mol\ \mathbf{SrBr_2}}{247.44\ g\ \mathbf{SrBr_2}} \times \frac{1\ mol\ \mathbf{SrSO_4}}{1\ mol\ \mathbf{SrBr_2}} \times \frac{183.68\ g\ \mathbf{SrSO_4}}{1\ mol\ \mathbf{SrSO_4}} = \boxed{17.6\ g\ \mathbf{SrSO_4}}$$

17.6 g $SrSO_4$ can be made and $SrBr_2$ is the L.R.

H_2SO_4 =	$SrSO_4$ = 17.6 g
$SrBr_2$ = 0 g	HBr

$$23.66\ g\ \mathbf{SrBr_2} \times \frac{1\ mol\ \mathbf{SrBr_2}}{247.44\ g\ \mathbf{SrBr_2}} \times \frac{2\ mol\ \mathbf{HBr}}{1\ mol\ \mathbf{SrBr_2}} \times \frac{80.917\ g\ \mathbf{HBr}}{1\ mol\ \mathbf{HBr}} = 15.5\ g\ \mathbf{HBr}$$

H_2SO_4 =	$SrSO_4$ = 17.6 g
$SrBr_2$ = 0 g	HBr = 15.5

$$23.66\ g\ \mathbf{SrBr_2} \times \frac{1\ mol\ \mathbf{SrBr_2}}{247.44\ g\ \mathbf{SrBr_2}} \times \frac{1\ mol\ \mathbf{H_2SO_4}}{1\ mol\ \mathbf{SrBr_2}} \times \frac{98.075\ g\ \mathbf{H_2SO_4}}{1\ mol\ \mathbf{H_2SO_4}} = 9.38\ g\ \mathbf{H_2SO_4}$$

You need to subtract this, so you have turn the volume of H_2SO_4 into mass:

$$0.525\ L\ \mathbf{solution} \times \frac{1.199\ mol\ \mathbf{H_2SO_4}}{1\ L\ \mathbf{solution}} \times \frac{98.075\ g\ \mathbf{H_2SO_4}}{1\ mol\ \mathbf{H_2SO_4}} = 61.7\ g\ \mathbf{H_2SO_4}$$

61.7 g H_2SO_4 (started) **– 9.38 g H_2SO_4** (used) = **52.3 g H_2SO_4 LEFT!**

H_2SO_4 = 52.3 g	**$SrSO_4$ = 17.6 g**
$SrBr_2$ = 0 g	**HBr = 15.5**

5) $2\ C_8H_{18(l)} + 25\ O_{2(g)} \rightarrow 16\ CO_{2(g)} + 18\ H_2O_{(l)}$

$$3.8\ \boldsymbol{g\ C_8H_{18}} \times \frac{1\ \boldsymbol{mol\ C_8H_{18}}}{114.2331\ \boldsymbol{g\ C_8H_{18}}} \times \frac{16\ \boldsymbol{mol\ CO_2}}{2\ \boldsymbol{mol\ C_8H_{18}}} \times \frac{44.0100\ \boldsymbol{g\ CO_2}}{1\ \boldsymbol{mol\ CO_2}} = \boxed{12\ \boldsymbol{g\ CO_2}}$$

$$22.1\ \boldsymbol{g\ O_2} \times \frac{1\ \boldsymbol{mol\ O_2}}{31.9988\ \boldsymbol{g\ O_2}} \times \frac{16\ \boldsymbol{mol\ CO_2}}{25\ \boldsymbol{mol\ O_2}} \times \frac{44.0100\ \boldsymbol{g\ CO_2}}{1\ \boldsymbol{mol\ CO_2}} = 19.5\ \boldsymbol{g\ CO_2}$$

12 g CO_2 can be made and C_8H_{18} is the L.R.

C_8H_{18} = 0 g	CO_2 = 12 g
O_2 =	H_2O =

$$3.8\ \boldsymbol{g\ C_8H_{18}} \times \frac{1\ \boldsymbol{mol\ C_8H_{18}}}{114.2331\ \boldsymbol{g\ C_8H_{18}}} \times \frac{18\ \boldsymbol{mol\ H_2O}}{2\ \boldsymbol{mol\ C_8H_{18}}} \times \frac{18.0153\ \boldsymbol{g\ H_2O}}{1\ \boldsymbol{mol\ H_2O}} = 5.4\ \boldsymbol{g\ H_2O}$$

C_8H_{18} = 0 g	CO_2 = 12 g
O_2 =	H_2O = 5.4

$$3.8\ \boldsymbol{g\ C_8H_{18}} \times \frac{1\ \boldsymbol{mol\ C_8H_{18}}}{114.2331\ \boldsymbol{g\ C_8H_{18}}} \times \frac{25\ \boldsymbol{mol\ O_2}}{2\ \boldsymbol{mol\ C_8H_{18}}} \times \frac{31.9988\ \boldsymbol{g\ O_2}}{1\ \boldsymbol{mol\ O_2}} = 13\ \boldsymbol{g\ O_2}$$

22.1 g O_2 (started) **– 13 g O_2** (used) = **9 g O_2 LEFT!**

C_8H_{18} = 0 g	**CO_2 = 12 g**
O_2 = 9	**H_2O = 5.4**

6) $2\ HI_{(aq)} + CaCO_{3(s)} \rightarrow CaI_{2(aq)} + H_2O_{(l)} + CO_{2(g)}$

$$0.010\ \boldsymbol{L\ solution} \times \frac{1.50\ \boldsymbol{mol\ HI}}{1\ \boldsymbol{L\ solution}} \times \frac{1\ \boldsymbol{mol\ CaI_2}}{2\ \boldsymbol{mol\ HI}} \times \frac{293.89\ \boldsymbol{g\ CaI_2}}{1\ \boldsymbol{mol\ CaI_2}} = \boxed{2.2\ \boldsymbol{g\ CaI_2}}$$

$$0.95\ \boldsymbol{g\ CaCO_3} \times \frac{1\ \boldsymbol{mol\ CaCO_3}}{100.09\ \boldsymbol{g\ CaCO_3}} \times \frac{1\ \boldsymbol{mol\ CaI_2}}{1\ \boldsymbol{mol\ CaCO_3}} \times \frac{293.89\ \boldsymbol{g\ CaI_2}}{1\ \boldsymbol{mol\ CaI_2}} = 2.8\ \boldsymbol{g\ CaI_2}$$

2.2 g CaI_2 can be made and HI is the L.R.

HI = 0 g	CaI_2 = 2.2 g	CO_2 =
$CaCO_3$ =	H_2O =	

$$0.010\ \boldsymbol{L\ solution} \times \frac{1.50\ \boldsymbol{mol\ HI}}{1\ \boldsymbol{L\ solution}} \times \frac{1\ \boldsymbol{mol\ CO_2}}{2\ \boldsymbol{mol\ HI}} \times \frac{44.0100\ \boldsymbol{g\ CO_2}}{1\ \boldsymbol{mol\ CO_2}} = 0.33\ \boldsymbol{g\ CO_2}$$

HI = 0 g	CaI_2 = 2.2 g	CO_2 = 0.33 g
$CaCO_3$ =	H_2O =	

$$0.010\ \boldsymbol{L\ solution} \times \frac{1.50\ \boldsymbol{mol\ HI}}{1\ \boldsymbol{L\ solution}} \times \frac{1\ \boldsymbol{mol\ H_2O}}{2\ \boldsymbol{mol\ HI}} \times \frac{18.0153\ \boldsymbol{g\ H_2O}}{1\ \boldsymbol{mol\ H_2O}} = 0.14\ \boldsymbol{g\ H_2O}$$

HI = 0 g	CaI_2 = 2.2 g	CO_2 = 0.33 g
$CaCO_3$ =	H_2O = 0.14 g	

$$0.010\ \boldsymbol{L\ solution} \times \frac{1.50\ \boldsymbol{mol\ HI}}{1\ \boldsymbol{L\ solution}} \times \frac{1\ \boldsymbol{mol\ CaCO_3}}{2\ \boldsymbol{mol\ HI}} \times \frac{100.09\ \boldsymbol{g\ CaCO_3}}{1\ \boldsymbol{mol\ CaCO_3}} = 0.75\ \boldsymbol{g\ CaCO_3}$$

0.95 g H_2CO_3 (started) **– 0.75 g H_2CO_3** (used) = **0.20 g H_2CO_3 LEFT!**

HI = 0 g	**CaI_2 = 2.2 g**	**CO_2 = 0.33 g**
$CaCO_3$ = 0.20 g	**H_2O = 0.14 g**	