(c) Rate of production of CO_2

$$CH_{4(g)} + 2\ O_{2(g)} \rightarrow CO_{2(g)} + 2\ H_2O_{(g)}$$

The rate of production of CO_2 is the same as compared to the rate of consumption of CH_4 is

1 x 1.25 mol / L·s = 1.25 mol / L·s

(d) Rate of production of H_2O

$$CH_{4(g)} + 2\ O_{2(g)} \rightarrow CO_{2(g)} + 2\ H_2O_{(g)}$$

The rate of production of H_2O is 2 times as fast as compared to the rate of consumption of CH_4 is

2 x 1.25 mol / L·s = 2.50 mol / L·s

9. (a) $4\ HI_{(g)} + O_{2\,(g)} \rightarrow 2\ I_{2(g)} + 2\ H_2O_{(g)}$

The rate of formation of I_2 is 2 times as fast as compared to the rate of consumption of O_2.

= 2 x 0.0042 mol / L·s = 0.0084 mol / L·s

(b) $4\ HI_{(g)} + O_{2\,(g)} \rightarrow 2\ I_{2(g)} + 2\ H_2O_{(g)}$

The rate of formation of H_2O is 2 times as fast as compared to the rate of consumption of O_2.

= 2 x 0.0042 mol / L·s = 0.0084 mol / L·s

(c) $4\ HI_{(g)} + O_{2\,(g)} \rightarrow 2\ I_{2(g)} + 2\ H_2O_{(g)}$

The rate of consumption of HI is 4 times as fast as compared to the rate of consumption of O_2.

= 4 x 0.0042 mol / L·s = 0.0168 mol / L·s

10. (a) $4\ NO_{2(g)} + O_{2\,(g)} \rightarrow 2\ N_2O_5$

The rate of formation of N_2O_5 is 2 times as fast as compared to the rate of consumption of O_2.

= 2 x 0.024 mol / L·s = 0.048 mol / L·s