(c) Rate of production of CO₂

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

The rate of production of CO₂ is the same as compared to the rate of consumption of CH₄ is

(d) Rate of production of H₂O

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

The rate of production of H₂O is 2 times as fast as compared to the rate of consumption of CH₄ is

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

The rate of formation of I₂ is 2 times as fast as compared to the rate of consumption of O₂.

$$= 2 \times 0.0042 \text{ mol } / \text{L·s} = 0.0084 \text{ mol } / \text{L·s}$$

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

The rate of formation of H₂O is 2 times as fast as compared to the rate of consumption of O₂.

(c) 4 HI_(g) + O_{2 (g)}
$$\rightarrow$$
 2 I_{2(g)} + 2 H₂O_(g)

The rate of consumption of HI is 4 times as fast as compared to the rate of consumption of O₂.

10. (a) 4 NO_{2(g)} + O_{2 (g)}
$$\rightarrow$$
 2 N₂O₅ \uparrow

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