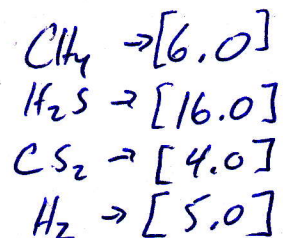


- 6) Consider the following closed system at a given temperature



- a) 3.0 moles of CH_4 , 8.0 moles of H_2S , 2.0 moles of CS_2 and 2.5 moles of H_2 are placed in a 0.500 L flask. If K_{eq} at this temperature is 1.21, what direction must this equilibrium shift to reach equilibrium?

$$Q = \frac{[\text{CS}_2][\text{H}_2]^4}{[\text{CH}_4][\text{H}_2\text{S}]^2}$$

$$= \frac{[4.0][5.0]^4}{[6.0][16.0]^2}$$

$$= 2500$$

$$1536$$

$$= 1.6$$

denominator must get larger to make Q smaller so

$$Q = K_{\text{eq}}$$

so reaction shifts to left.

- b) In a separate experiment, 3.5 moles of CH_4 , 1.5 moles of CS_2 and 2.0 moles of H_2 are placed in the same size flask at the same temperature, what is the equilibrium concentration of H_2S ?

$$1.21 = \frac{[3.0][4.0]^4}{[7.0][\text{H}_2\text{S}]^2}$$

$$[\text{H}_2\text{S}]^2 = \frac{[3.0][4.0]^4}{[7.0]1.21}$$

$$[\text{H}_2\text{S}]^2 = 90.6729$$

$$= 9.5 \frac{\text{mol}}{\text{L}}$$

