

## Задача II-2. ПРОИЗВОДСТВО МЕТАНОЛА

### II-2-1

$$n[\text{CO}, \beta] = 3/2 \times n[\text{CH}_3\text{OH}, \gamma] = 1500 \text{ моль} \cdot \text{с}^{-1}$$
$$n[\text{H}_2, \beta] = 3 \times n[\text{CO}, \beta] = 500 \text{ моль} \cdot \text{с}^{-1}$$

### II-2-2

$$n[\text{CO}, \gamma] = n[\text{CO}, \beta] - n[\text{CH}_3\text{OH}, \gamma] = 1500 - 1000 = 500 \text{ моль} \cdot \text{с}^{-1}$$
$$n[\text{H}_2, \gamma] = n[\text{H}_2, \beta] - 2 \times n[\text{CH}_3\text{OH}, \gamma] = 4500 - 2 \times 1000 = 2500 \text{ моль} \cdot \text{с}^{-1}$$

### II-2-3

$$n[\text{CH}_4, \alpha] = n[\text{CO}, \beta] = 1500 \text{ моль} \cdot \text{с}^{-1}$$
$$n[\text{H}_2\text{O}, \alpha] = n[\text{CO}, \beta] = 1500 \text{ моль} \cdot \text{с}^{-1}$$

### II-2-4

$$p[\text{CO}, \gamma] = 1.25 \text{ МПа}$$

$$p[\text{H}_2, \gamma] = 6.25 \text{ МПа}$$

$$p[\text{CH}_3\text{OH}, \gamma] = 2.50 \text{ МПа}$$

Ваши расчеты:

$$n_{\text{tot}} = 1000 + 500 + 2500 = 4000 \text{ моль} \cdot \text{с}^{-1}$$

$$p[\text{CO}, \gamma] = (500/4000) \times 10 \text{ МПа} = 1.25 \text{ МПа}$$

$$p[\text{H}_2, \gamma] = (2500/4000) \times 10 \text{ МПа} = 6.25 \text{ МПа}$$

$$p[\text{CH}_3\text{OH}, \gamma] = (1000/4000) \times 10 \text{ МПа} = 2.50 \text{ МПа}$$

### II-2-5

Ответ  $K_p = 5.12 \cdot 10^{-4}$

Ответ  $T_\gamma = 630 \text{ К}$

Ваши расчеты:

$$K_p = (2.5 \times 0.1^2) / (1.25 \times 6.25^2) = 5.12 \cdot 10^{-4}$$