**Assignment 6**

The due date for submitting this assignment has passed. As our record shows, you have not submitted this assignment.

1. \( G^\circ = G - G^\circ \)
2. \( G^\circ = H - T \Delta S \)
3. \( G^\circ = G - G^\circ \)
4. \( H^\circ = G^\circ \)
5. \( G^\circ = G^\circ \)

No, the answer is incorrect. **Score: 3**

6. Ethanol is an important product of biogas industry. Various plant sources are used as raw materials for ethanol production. These substances and products subjected to microbial fermentation which yields the product. The quality of the products is a result of the purification strategies followed. Ethanol is mainly purified through distillation on an industrial scale. Considering a distillation process where an ethanol/water mixture is separated, compute the activity coefficients using:

   - Vapour model if the mixture contains 49% ethanol by mass. 
   - Given: \( \alpha \approx 0.85 \) and \( \Delta G_{\text{mix}} = 0.082 \)

   - For the mixture containing 49% ethanol by mass: \( \alpha \approx 0.85 \)
   - \( \alpha = t_1 \cdot (1-t_1) = 0.42 \)
   - \( \alpha = 0.85 \cdot 0.15 = 0.27 \)
   - \( \alpha = 0.85 \cdot 0.85 = 0.73 \)
   - \( \alpha = 0.85 \cdot 0.15 = 0.27 \)
   - No, the answer is incorrect. **Score: 4**

7. Which of the following solutions is valid at infinite dilution where mole fraction of ethanol (\( x_1 \)) is zero?  

   - \( i = 0.99 \)
   - \( i = 0.41 \)
   - \( i = 0.45 \)
   - \( i = 1.01 \)

   No, the answer is incorrect. **Score: 1**

8. Compute the activity coefficients using Wilson's model for a methanol-water mixture which contains 49% methanol. 

   - Given: \( A_{12} = 0.647 \) and \( A_{21} = 0.568 \)

   - \( A_{12} = 0.647 \)
   - \( A_{21} = 0.568 \)
   - \( A_{12} = 0.647 \)
   - No, the answer is incorrect. **Score: 2**

   - \( A_{12} = 0.647 \)
   - \( A_{21} = 0.568 \)

9. Compute the activity coefficients using van Laar model for a methanol-water mixture which contains 49% methanol. 

   - Given: \( A_{12} = 0.647 \) and \( A_{21} = 0.568 \)

   - \( A_{12} = 0.647 \)
   - \( A_{21} = 0.568 \)
   - \( A_{12} = 0.647 \)
   - No, the answer is incorrect. **Score: 2**

10. Calculate the degree of freedom of a pure component present as a mixture of liquid and vapor:  

    - No, the answer is incorrect. **Score: 1**

### Accepted Answers

1. A mixture of 3 liquids is subjected to evaporation to form vapours of the same components. Identify the degree of freedom in the system:  

   - 0
   - 1
   - 2
   - 3
   - 4
   - 5

   No, the answer is incorrect. **Score: 2**

2. The number of variables needed to completely specify the liquid phase in the above system in which two liquids evaporate to:

   - 2
   - 3
   - 4
   - 5
   - 6

   No, the answer is incorrect. **Score: 2**