

Name: Solutions

Problem 1: (a) Describe fugacity (e.g., what is it, what are its units, why do we even use it). (b) Describe the fugacity coefficient (e.g., what is it, what are its units) and show the fugacity coefficient for an ideal gas.

- ① Fugacity is a thermodynamic property that replaces pressure in ~~the~~ accurate calculations of real fluids. It is used to explain mathematical inconveniences since $\mu \rightarrow -\infty$ as $P \rightarrow 0$. Fugacity has units of pressure (kPa, bar, atm, ...).
- ② Fugacity coefficient $\phi = \frac{f}{P}$, and it is unitless. For an ideal gas, $\phi = 1$.

Problem 2: True/False

- (a) The fugacity of a liquid is always higher than its corresponding ideal gas. Students get points for this part.
- (b) The fugacity of isobutylene at 280°C and 100 bar is greater than that of isobutylene at 280°C and 20 bar. True
- (c) The fugacity of a liquid scales linearly with pressure. False