Unit 7 - Week 5: Intermolecular Interactions and E.o.S

Assessment 5

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-03-04, 23:59 IST.

1) Which of the following is van der Waals equation of state? *4 points*

- $v^3 - \left[\frac{RT}{p} + b\right]v^2 + \frac{a}{p}v - \frac{ab}{p} = 0$
- $v^3 - \left(\frac{RT}{p}\right)v^2 - \left(b^2 + \frac{bRT}{p} - \frac{a}{p\sqrt{T}}\right)v - \frac{ab}{p\sqrt{T}} = 0$
- $v^3 + \left(b - \frac{RT}{p}\right)v^2 - \left(3b^2 + \frac{2bRT}{p} - \frac{a}{p}\right)v + b^3 + \frac{b^2RT}{p} - \frac{ab}{p} = 0$
- None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
$v^3 - \left[\frac{RT}{p} + b\right]v^2 + \frac{a}{p}v - \frac{ab}{p} = 0$

2) Which of the following is Redlich-Kwang equation of state? *4 points*

- $v^3 - \left[\frac{RT}{p} + b\right]v^2 + \frac{a}{p}v - \frac{ab}{p} = 0$
- $v^3 - \left(\frac{RT}{p}\right)v^2 - \left(b^2 + \frac{bRT}{p} - \frac{a}{p\sqrt{T}}\right)v - \frac{ab}{p\sqrt{T}} = 0$
- $v^3 + \left(b - \frac{RT}{p}\right)v^2 - \left(3b^2 + \frac{2bRT}{p} - \frac{a}{p}\right)v + b^3 + \frac{b^2RT}{p} - \frac{ab}{p} = 0$
- None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
$v^3 - \left(\frac{RT}{p}\right)v^2 - \left(b^2 + \frac{bRT}{p} - \frac{a}{p\sqrt{T}}\right)v - \frac{ab}{p\sqrt{T}} = 0$

3) Which of the following is Peng-Robinson equation of state? *4 points*

- $v^3 - \left[\frac{RT}{p} + b\right]v^2 + \frac{a}{p}v - \frac{ab}{p} = 0$
- $v^3 - \left(\frac{RT}{p}\right)v^2 - \left(b^2 + \frac{bRT}{p} - \frac{a}{p\sqrt{T}}\right)v - \frac{ab}{p\sqrt{T}} = 0$
- $v^3 + \left(b - \frac{RT}{p}\right)v^2 - \left(3b^2 + \frac{2bRT}{p} - \frac{a}{p}\right)v + b^3 + \frac{b^2RT}{p} - \frac{ab}{p} = 0$
- None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
$v^3 + \left(b - \frac{RT}{p}\right)v^2 - \left(3b^2 + \frac{2bRT}{p} - \frac{a}{p}\right)v + b^3 + \frac{b^2RT}{p} - \frac{ab}{p} = 0$

4) Consider a gas obeying van der Waals equation of state, then what is it's compressibility at the critical conditions? *4 points*

- 0.307
- 0.333
- 0.375
- None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
0.375

5) Consider a gas obeying Redlich-Kwang equation of state, then what is it's compressibility at the critical conditions? *4 points*

- 0.307
- 0.333
- 0.375
- None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
0.333

6) Consider a gas obeying Peng-Robinson equation of state, then what is it's compressibility at the critical conditions? *4 points*

- 0.307
- 0.333
- 0.375
- None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
0.307

7) *4 points*

In the virial equation of state $z = \frac{Pv}{RT} = 1 + \frac{B}{v} + \frac{C}{v^2} + \frac{D}{v^3} + \ldots\ldots$, coefficient "C" accounts for

- deviations from ideal behaviour due to interactions between three molecules
- deviations from ideal behaviour due to interactions between two molecules
- deviations from ideal behaviour due to interactions between four molecules
- None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
deviations from ideal behaviour due to interactions between three molecules

8) *4 points*

In the virial equation of state $z = \frac{Pv}{RT} = 1 + \frac{B}{v} + \frac{C}{v^2} + \frac{D}{v^3} + \ldots\ldots$, coefficient "B" accounts for

- deviations from ideal behaviour due to interactions between three molecules
- deviations from ideal behaviour due to interactions between two molecules
- deviations from ideal behaviour due to interactions between four molecules
- None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
deviations from ideal behaviour due to interactions between two molecules

9) The 2nd virial coefficient obtained from which of the following intermolecular potential is independent of the temperature? *4 points*

- Sutherland potential
- Square well potential
- Lennard Jones potential
- Hard sphere model

No, the answer is incorrect.
Score: 0
Accepted Answers:
Hard sphere model

10) For a system, if the two-body intermolecular potentials $\Gamma_{ij}, \Gamma_{ik}, \Gamma_{jk}$ are known, then what is the important assumption for obtaining the 3rd virial coefficient from these potentials? *4 points*

- $\Gamma_{ij} + \Gamma_{ik} + \Gamma_{jk} = 0$
- $\Gamma_{ij} + \Gamma_{ik} + \Gamma_{jk} > 0$
- $\Gamma_{ij} + \Gamma_{ik} + \Gamma_{jk} < 0$
- $\Gamma_{ijk} = \Gamma_{ij} + \Gamma_{ik} + \Gamma_{jk}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\Gamma_{ijk} = \Gamma_{ij} + \Gamma_{ik} + \Gamma_{jk}$