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Properties from Volumetric

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Non-Ideal Systems

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Equilibria of Multicomponent

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## Unit 4 - Week 2: Estimation of Thermodynamic Properties

No, the answer is incorrect.

Accepted Answers:

Score: 0

101.29 bar

	9 IST.
<ol> <li>Saturated water at 327°C has vapour pressure of 8.6 MPa and fugacity of 6.7 MPa. At such conditions, liquid has a molar volume of 25 cm<sup>3</sup>/mol nd the vapour has a molar volume of 40 cm<sup>3</sup>/mol. Then what is fugacity at 10 MPa?</li> </ol>	6 poir
○ 4.36 MPa	
○ 8.51 MPa ○ 6.75 MPa	
○ 9.24 MPa	
No, the answer is incorrect. Score: 0	
Accepted Answers: 6.75 MPa	
2) The van der Waals constants for n-butane (1) and n-octane (2) are given as: = $1.3874 \text{ Pa} (\text{m}^3/\text{mol})^2$ , $b_1 = 0.1163 \times 10^{-3} \text{ m}^3/\text{mol}$ , $a_2 = 3.7890 \text{ Pa} (\text{m}^3/\text{mol})^2$ and $b_2 = 0.237 \times 10^{-3} \text{ m}^3/\text{mol}$ . What are the van der Waals constants "a" and pulmolar mixture of n-butane and n-octane?	6 poir "b" for
$a = 2.4405 \text{ Pa } (\text{m}^3/\text{mol})^2, b = 0.1767 \times 10^{-3} \text{ m}^3/\text{mol}$	
$a = 5.4315 \text{ Pa } (\text{m}^3/\text{mol})^2, \ b = 2.1837 \times 10^{-6} \text{ m}^3/\text{mol}$ $a = 7.3985 \text{ Pa } (\text{m}^3/\text{mol})^2, \ b = 5.1315 \times 10^{-4} \text{ m}^3/\text{mol}$	
O a = $6.1767$ Pa (m <sup>3</sup> /mol) <sup>2</sup> , b = $3.2405 \times 10^{-5}$ m <sup>3</sup> /mol  No, the answer is incorrect.	
Score: 0 Accepted Answers:	
$a = 2.4405 Pa (m^3/mol)^2$ , $b = 0.1767 \times 10^{-3} m^3/mol$	0 1
For a gaseous mixture, the appropriate equation of state is found to $P=rac{RT}{v-b}-rac{a}{v^2}$ (i.e., van der Waals equation) where constants "a"	6 poii
nd "b" are given as $a = 2.4405 \text{ Pa} (\text{m}^3/\text{mol})^2$ and $b = 0.1767 \times 10^{-3} \text{ m}^3/\text{mol}$ . What is molar volume of this mixture at $P = 16$ bar and $T = 600$ K?	
○ 6.431×10 <sup>-4</sup> m³/mol ○ 2.781×10 <sup>-3</sup> m³/mol	
○ 5.634×10 <sup>-6</sup> m³/mol	
○ 8.529×10 <sup>-9</sup> m <sup>3</sup> /mol  No, the answer is incorrect.	
Score: 0 Accepted Answers:	
2.781×10 <sup>-3</sup> m <sup>3</sup> /mol	6
For a gaseous mixture, the appropriate equation of state is found to $P = \frac{RT}{m-h} - \frac{a}{m^2}$ (i.e., van der Waals equation) where constants "a"	6 poi
$v-b$ $v^2$ and "b" are given as: $a = 2.4405  \text{Pa}  (\text{m}^3/\text{mol})^2$ and $b = 0.1767 \times 10^{-3}  \text{m}^3/\text{mol}$ . What is the compressibility of this mixture at P = 16 bar and T = 600K?	
0.646	
○ 0.563 ○ 0.474	
O.892	
No, the answer is incorrect. Score: 0 Accepted Answers:	
0.892	
The constants for van der Waals equation $\mathbf{p} = \frac{RT}{2} = \frac{a}{a}$ for n-butane (1) and n-octane (2) are given as: $a_1 = 1.3874$ Pa $(m^3/mol)^2$ by $a_2 = 1.3874$ Pa $(m^3/mol)^2$ by $a_3 = 1.3874$ Pa $(m^3/mol)^2$ by $a_4 = 1.3874$ Pa $(m^3/mol)^2$	6 poi
The constants for van der Waals equation $P = \frac{RT}{v-b} - \frac{a}{v^2}$ for n-butane (1) and n-octane (2) are given as: $a_1 = 1.3874$ Pa (m³/mol)², $b_1 = 0.000$	
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11.547 bar	
○ 7.677 bar ○ 4.246 bar	
○ 9.782 bar	
No, the answer is incorrect. Score: 0 Accepted Answers:	
7.677 bar	
The constants for van der Waals equation $P = \frac{RT}{v-b} - \frac{a}{v^2}$ for n-butane (1) and n-octane (2) are given as: $a_1 = 1.3874$ Pa (m³/mol)², $b_1 = \frac{RT}{v-b} = \frac{RT}{v-b}$	6 poir
$v-b$ $v^2$ 0.1163×10 <sup>-3</sup> m³/mol, $a_2 = 3.7890$ Pa ( m³/mol) <sup>2</sup> and $b_2 = 0.237 \times 10^{-3}$ m³/mol. For their equimolar mixture, these constants are $a = 2.4405$ Pa (m³/mol) <sup>2</sup> and	
1.1767×10 <sup>-3</sup> m <sup>3</sup> /mol; and the molar volume of the mixture is $2.781 \times 10^{-3}$ m <sup>3</sup> /mol. What is the fugacity of n-octane (2) at P = 16 bar and T = 600K?	D =
○ 3.986 bar ○ 7.624 bar	
9.564 bar	
O 6.763 bar  No, the answer is incorrect.	
Score: 0 Accepted Answers:	
6.763 bar	
7) PT a	
The constants for van der Waals equation $P = \frac{KT}{m} - \frac{\alpha}{m}$ for n-butane (1) and n-octane (2) are given as: $a_1 = 1.3874$ Pa $(m^3/mol)^2$ , $b_1 = 1.3874$ Pa $(m^3/mol)^2$ , $b_2 = 1.3874$ Pa $(m^3/mol)^2$ , $b_3 = 1.3874$ Pa $(m^3/mol)^2$ , $b_4 = 1.3874$ Pa $(m^3/mol)^2$	
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1163×10 <sup>-3</sup> m <sup>3</sup> /mol, a <sub>2</sub> = 3.7890 Pa ( m <sup>3</sup> /mol) <sup>2</sup> and b <sub>2</sub> = 0.237×10 <sup>-3</sup> m <sup>3</sup> /mol. For their equimolar mixture, these constants are a = 2.4405 Pa (m <sup>3</sup> /mol) <sup>2</sup> and 1.767×10 <sup>-3</sup> m <sup>3</sup> /mol; and the molar volume of the mixture is 2.781×10 <sup>-3</sup> m <sup>3</sup> /mol. What is the fugacity of the mixture at P = 16 bar and T = 600K?  14.409 bar  12.354 bar  10.526 bar  8.648 bar  No, the answer is incorrect. Score: 0  Accepted Answers: 14.409 bar  8) A gas mixture composing of 20% A, 35% B and 45% C on mole% basis, the fugacity of the mixture at T = 398K and P = 6.08 MPa?  4.52 MPa  6.62 MPa  7.96 MPa  2.42 MPa  No, the answer is incorrect. Score: 0  Accepted Answers: 150 MPa  9. Calculate fugacity of water vapour at 320°C and 70 bar using Redlich-Kwong equation of state with constants a = 14.27 Pa K <sup>1/2</sup> m <sup>6</sup> /mol <sup>2</sup> and b = 11×10 <sup>-5</sup> m <sup>3</sup> /mol.	6 poi
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1.1163×10 <sup>-3</sup> m <sup>3</sup> /mol, a <sub>2</sub> = 3.7890 Pa (m <sup>3</sup> /mol) <sup>2</sup> and b <sub>2</sub> = 0.237×10 <sup>-3</sup> m <sup>3</sup> /mol. For their equimolar mixture, these constants are a = 2.4405 Pa (m <sup>3</sup> /mol) <sup>2</sup> and to 1.767×10 <sup>-3</sup> m <sup>3</sup> /mol, and the molar volume of the mixture is 2.781×10 <sup>-3</sup> m <sup>3</sup> /mol. What is the fugacity of the mixture at P = 16 bar and T = 600K?  14.409 bar 12.354 bar 10.526 bar 8.648 bar No, the answer is incorrect. Score: 0 Accepted Answers: 14.409 bar 8) A gas mixture composing of 20% A, 35% B and 45% C on mole% basis, the fugacity o-efficient of these are 0.7, 0.6, and 0.9 respectively. What is the fugacity of the mixture at T = 398K and P = 6.08 MPa?  4.52 MPa 6.62 MPa 7.96 MPa 2.42 MPa No, the answer is incorrect. Score: 0 No, the answer is incorrect. Score: 0 Calculate fugacity of water vapour at 320°C and 70 bar using Redlich-Kwong equation of state with constants a = 14.27 Pa K <sup>1/2</sup> m <sup>6</sup> /mol <sup>2</sup> and b = 1.11×10° m <sup>7</sup> /mol. 8.45 bar 4.7.82 bar 6.0.46 bar 7.0.31 bar No, the answer is incorrect. Score: 0 Accepted Answers: 60.46 bar	6 poin
.1163×10 <sup>-3</sup> m <sup>3</sup> /mol, a <sub>2</sub> = 3.7890 Pa (m <sup>3</sup> /mol) <sup>2</sup> and b <sub>2</sub> = 0.237×10 <sup>-3</sup> m <sup>3</sup> /mol. For their equimolar mixture, these constants are a = 2.4405 Pa (m <sup>3</sup> /mol) <sup>2</sup> and .1767×10 <sup>-3</sup> m <sup>3</sup> /mol. What is the fugacity of the mixture at P = 16 bar and T = 600K?  14.409 bar 12.354 bar 10.526 bar 8.648 bar  No, the answer is incorrect. Score: 0  Accepted Answers: 14.409 bar  8) A gas mixture composing of 20% A, 35% B and 45% C on mole% basis, the fugacity of the mixture at T = 398K and P = 6.08 MPa?  4.52 MPa 6.62 MPa 7.96 MPa 2.42 MPa No, the answer is incorrect. Score: 0 Accepted Answers: 4.782 bar 9) Calculate fugacity of water vapour at 320°C and 70 bar using Redlich-Kwong equation of state with constants a = 14.27 Pa K <sup>1/2</sup> m <sup>5</sup> /mol <sup>2</sup> and b = 11.110° m <sup>3</sup> /mol.  No, the answer is incorrect. Score: 0 Accepted Answers: 60.46 bar 70.31 bar No, the answer is incorrect. Score: 0 Accepted Answers: 60.46 bar 70.31 bar No, the answer is incorrect. Score: 0 Accepted Answers:	6 poir
1.1163×10 <sup>-3</sup> m <sup>3</sup> /mol, a <sub>2</sub> = 3.7890 Pa (m <sup>3</sup> /mol) <sup>2</sup> and b <sub>2</sub> = 0.237×10 <sup>-3</sup> m <sup>3</sup> /mol. For their equimolar mixture, these constants are a = 2.4405 Pa (m <sup>3</sup> /mol) <sup>2</sup> and 1.767×10 <sup>-3</sup> m <sup>3</sup> /mol, and the molar volume of the mixture is 2.781×10 <sup>-3</sup> m <sup>3</sup> /mol. What is the fugacity of the mixture at P = 16 bar and T = 600K?  1.4.409 bar 12.354 bar 10.526 bar 8.648 bar No, the answer is incorrect. Score: 0 Accepted Answers: 14.409 bar 8) A gas mixture composing of 20% A, 35% B and 45% C on mole% basis, the fugacity of the mixture at T = 398K and P = 6.08 MPa?  4.52 MPa 6.62 MPa 7.96 MPa 2.42 MPa No, the answer is incorrect. Score: 0 No, the answer is incorrect. Score: 0 Score 10 Score 20 Score 30	6 poir
1.1163×10 <sup>-9</sup> m <sup>9</sup> /mol, a <sub>2</sub> = 3.7890 Pa (m <sup>9</sup> /mol) <sup>2</sup> and b <sub>2</sub> = 0.237×10 <sup>-9</sup> m <sup>9</sup> /mol. For their equimolar mixture, these constants are a = 2.4405 Pa (m <sup>9</sup> /mol) <sup>2</sup> and 1.767×10 <sup>-9</sup> m <sup>9</sup> /mol; and the molar volume of the mixture is 2.781×10 <sup>-9</sup> m <sup>9</sup> /mol. What is the fugacity of the mixture at P = 16 bar and T = 600K?  14.409 bar 12.354 bar 10.526 bar 8.648 bar  No, the answer is incorrect. Score: 0  Accepted Answers: 14.409 bar  8) A gas mixture composing of 20% A, 35% B and 45% C on mole% basis, the fugacity of officient of these are 0.7, 0.6, and 0.9 respectively. What is the fugacity of the mixture at T = 398K and P = 6.08 MPa?  4.52 MPa 6.62 MPa 7.96 MPa 2.42 MPa No, the answer is incorrect. Score: 0 Accepted Answers: 4.52 MPa 9) Calculate fugacity of water vapour at 320°C and 70 bar using Redlich-Kwong equation of state with constants a = 14.27 Pa K <sup>1/2</sup> m <sup>8</sup> /mol <sup>2</sup> and b = 1.11×10 <sup>-9</sup> m <sup>9</sup> /mol.  88.45 bar 47.82 bar 6.0.46 bar No, the answer is incorrect. Score: 0 Accepted Answers: 60.46 bar  10) Calculate fugacity of compressed liquid water at 320°C and 170 bar using Redlich-Kwong equation of state with constants a = 14.27 Pa K <sup>1/2</sup> m <sup>8</sup> /mol <sup>2</sup> and b = 2.11×10 <sup>-9</sup> m <sup>9</sup> /mol.	