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Unit 7 - Week 6

Week 6 Assignment 6

The due date for submitting this assignment has passed. **Due on 2018-09-12, 23:59 IST.**
As per our records you have not submitted this assignment.

1) Which among the following is not a direct contact separation process *1 point*

- a) Distillation
- b) Membrane separation
- c) Absorption
- d) Adsorption

No, the answer is incorrect.
Score: 0

Accepted Answers:
b) Membrane separation

2) Extraction is used for the separation of *1 point*

- a) Liquid – Liquid system
- b) Liquid – Vapor system
- c) Liquid – Solid system
- d) Gas – Solid system

No, the answer is incorrect.
Score: 0

Accepted Answers:
a) Liquid – Liquid system

3) Leaching is used for the separation of *1 point*

- a) Liquid – Liquid system
- b) Liquid – Vapor system
- c) Liquid – Solid system
- d) Gas – Solid system

No, the answer is incorrect.
Score: 0

c) Liquid – Solid system

d) Gas – Solid system

No, the answer is incorrect.
Score: 0

Accepted Answers:
b) Liquid – Vapor system

5) ***1 point***

The relative volatility of A in a mixture with B is α_{AB} = 2.5. The equilibrium vaporization ratio of B is K_B = 0.7. The value of α_{BA}?

Given:

$\alpha_{AB} = 2.5$

K_B=0.7

To Find:

α_{BA}

a) 0.4

b) 0.5

c) 0.7

d) 0.8

No, the answer is incorrect.
Score: 0

Accepted Answers:
a) 0.4

6) The relative volatility of A in a mixture with B is $\alpha_{AB} = 2.5$. The mole fraction of B in the first droplet of liquid condensed from an equimolar saturated vapor mixture of A and B is about ***1 point***

Given:

$\alpha_{AB} = 1.5$

Equimolar saturated vapor mixture i.e,

$y_A = y_B = 0.5$

To Find:

x_B

a) 0.45

b) 0.51

c) 0.71

d) 0.80

No, the answer is incorrect.
Score: 0

Accepted Answers:
c) 0.71

7) Consider a mixture of 30 mole% A, 30% B and 40% C. The solution is approximately ideal. The following relative volatility values are known at 1 atm pressure: $\alpha_{AB} = 1.4, \alpha_{CB} = 1.2$. The value of α_{CA} is ***1 point***

Given:

$\alpha_{AB} = 1.4$

$\alpha_{CB} = 1.2$

To Find:

α_{CA}

a) 0.21

b) 0.57

c) 0.41

d) 0.86

No, the answer is incorrect.
Score: 0

Accepted Answers:
d) 0.86

8) A ternary solution of A (30 mole%), B (40 mole%) and C may be considered to be ideal. The equilibrium vaporization ratios are $K_1 = 2.25$, $K_2 = 1.02$ and $K_3 = 0.6$ at 1 atm total pressure. The solution is: ***1 point***

Given:

$K_1 = 2.25$

$K_2 = 1.02$

$K_3 = 0.6$

$x_1 = 0.3$

$x_2 = 0.4$

$x_3 = 0.3$

a) Below the bubble point

b) Saturated liquid

c) Above the bubble point

d) Saturated vapor

No, the answer is incorrect.
Score: 0

Accepted Answers:
c) Above the bubble point

9) Water content of natural gas drops with increase in ***1 point***

a) Temperature

b) Pressure

c) Amount of liquefied acid gases

d) Molecular weight

No, the answer is incorrect.
Score: 0

Accepted Answers:
a) Temperature
d) Molecular weight

10) Which of the following analytical method is NOT used for water estimation in sour natural gas ***1 point***

a) Zhu et al. method

b) Maddox's component contribution model

c) Robinson's H_2 S model

d) Wang et al. method

No, the answer is incorrect.
Score: 0

Accepted Answers:
a) Zhu et al. method

11) 500 ppmv CO2 in air at 25°C and 1 atm is equivalent to **1 point**

- a) 1121.0 mg/m3
- b) 599.7 mg/m3
- c) 500.0 mg/m3
- d) 899.7 mg/m3

No, the answer is incorrect.
Score: 0

Accepted Answers:
d) 899.7 mg/m3

12) Dehydration reduces: **1 point**

- a) The chances of gas hydrate formation in natural gas.
- b) The corrosion in natural gas pipelines.
- c) The heating value of the natural gas.
- d) The cost of separation of water.

No, the answer is incorrect.
Score: 0

Accepted Answers:
a) The chances of gas hydrate formation in natural gas.
b) The corrosion in natural gas pipelines.
c) The heating value of the natural gas.

13) **1 point**

12 m^3 of oxygen is to be separated by adsorption using silica gel at 30 kPa and 90.1 K. The saturat pressure of O_2 at 90.1 K is 100.4 kPa. The mass of silica gel required for this purpose is about (Hint: isotherm using the parameters given in Table 1.)

		Temperature		v_m		θ_a	
Adsorbent	Gas	K	°R	dm^3/kg	ft^3/lb_m	K	°R
Unpromoted Fe catalyst	N_2	90.1	162.2	0.268	0.0043	389.6	701.3
Fe-Al_2O_3 catalyst	N_2	90.1	162.2	2.091	0.0335	389.6	701.3
Cr_2O_3 gel	N_2	90.1	163.2	50.50	0.809	371.6	668.8
Silica gel	N_2	90.1	162.2	127.0	2.034	399.8	719.6
Silica gel	N_2	90.1	162.2	135.2	2.166	362.2	651.9
Silica gel	A	90.1	162.2	122.0	1.955	299.7	539.4
Silica gel	O_2	90.1	162.2	132.0	2.115	295.5	531.9
Silica gel	CO	90.1	162.2	132.0	2.115	490.6	883.1
Silica gel	CO_2	195	351	102.4	1.640	672.5	1210.5
Charcoal	H_2O	283	509	185.4	2.97	−327.7	−589.8
Charcoal	H_2O	258	464	185.4	2.97	0	0
Charcoal	N_2	77.3	139.2	181.5	2.908	300.2	540.4
Charcoal	N_2	90.1	162.2	173.0	2.772	331.6	596.8
Charcoal	A	77.3	139.2	215.6	3.454	341.1	613.9
Charcoal	A	90.1	162.2	215.6	3.454	376.8	678.3
Charcoal	O_2	90.1	162.2	234.7	3.760	192.5	346.5
Charcoal	CO	90.1	162.2	179.7	2.878	246.9	444.4

- a) 61.3 kg
- b) 109.5 kg
- c) 21.4 kg
- d) 156.0 kg

No, the answer is incorrect.
Score: 0

Accepted Answers:
a) 61.3 kg

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