

## Sample Questions

### Chemical Engineering

1. Which of the following chemical formulae represents the Newton number?

- a.  $(N^2 D^3 \alpha \rho) / (\sigma g_i)$
- b.  $(N D^2 \alpha \rho) / \mu$
- c.  $(P g_c) / (N^3 D^5 \alpha \rho)$
- d.  $(N^2 D \alpha) / g$

2. The grading of a phosphate fertilizer is based on its \_\_\_\_\_.

- a. P content
- b.  $PCl_3$  content
- c.  $H_3PO_4$  content
- d.  $P_2O_5$  content

3. Why does the rate of solid-liquid extraction decrease with increasing temperature?

- a. Due to increased liquid viscosity & diffusivity
- b. Due to increased liquid viscosity & decreased diffusivity
- c. Due to decreased liquid viscosity & increased diffusivity
- d. Due to decreased liquid viscosity & diffusivity

4. What is the change in internal energy of 25 kmol of  $CO_2$  gas when it is isothermally expanded from 10,132 kPa to 101.32 kPa at 373 K, the corresponding molar volumes being  $0.215 \text{ m}^3/\text{kmol}$  and  $30.53 \text{ m}^3/\text{kmol}$ ? (Assume  $CO_2$  obeys  $[P + (365/V^2)](V - 0.043) = RT$ )

- a. 22,143 kJ
- b. 32,143 kJ
- c. 42,143 kJ
- d. 52,143 kJ

5. A mixture of A and B conforms closely to Raoult's law. The pure component vapor pressures

$P_A^S$  and  $P_B^S$  in kPa at  $x^\circ\text{C}$  are given by

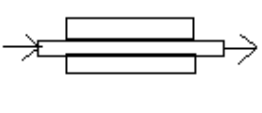
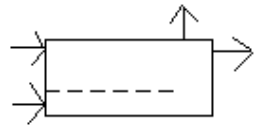
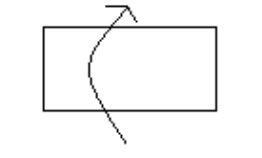
$$\ln P_A^S = 14.27 - [2945/(x + 224)]$$

$$\ln P_B^S = 14.20 - [2973/(x + 209)]$$

If bubble point of a certain mixture of A and B is  $76^\circ\text{C}$  at a total pressure of 80 kPa, then the first vapor will contain\_\_\_\_\_.

- a. 52.5% A
- b. 72.5% A
- c. 86.5% A
- d. 92.5% A

6. Match the dryers used for different industrial applications

1		a	Drying of refractory bricks
2		b	Drying of sand in foundaries
3		c	Drying of CAN fertilizer

- a. 1-b, 2-c, 3-a
- b. 1-a, 2-c, 3-b
- c. 1-b, 2-a, 3-c
- d. 1-a, 2-b, 3-b

7. If scrubber A has a lower HTU than scrubber B for the same performance, which of the following contactors is likely to be more profitable?

- a. Scrubber A
- b. Scrubber B
- c. Cannot Say
- d. HTU has no bearing on profitability

8. Which of the following can be crystallized out of their aqueous solution?

- a. NaCl
- b. Sucrose
- c. Terephthalic Acid
- d.  $\text{CaCl}_2$
- e. All of the above

9. Identify the Clausius-Clayperon equation among the following?

- a.  $\frac{dP}{dT} = \frac{\Delta H}{T\Delta V}$
- b.  $\ln P = -\frac{\Delta H}{RT} + \text{constant}$
- c.  $\Delta F = \Delta H + T \left[ \frac{\partial(\Delta F)}{\partial T} \right]_P$
- d. None of these

All set to take the AMCAT?

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