

# CHEMICAL ENGINEERING

Q1. Match List I with List II and select the correct answer.

- A2, B3, C1
- A3, B1, C2
- A1, B2, C3
- A1, B3, C2

List I	List II
A. $(ND_{ap}^2)/\mu$	1. Power number
B. $(Pg_c)/(N^3D_{ap}^5)$	2. Weber number
C. $(N^2D_{ap}^3)/(\sigma g_i)$	3. Reynold's number

Q2. The grading of a phosphatic fertilizer is done based on its\_\_\_\_\_.

- $PCl_3$  content
- P content
- $H_3PO_4$  content
- $P_2O_5$  content

Q3. Which of the following reasons account for the increase in the rate of solid liquid extraction with increasing temperature?

- Increased liquid viscosity & diffusivity
- Increased liquid viscosity & decreased diffusivity
- Decreased liquid viscosity & increased diffusivity
- Decreased liquid viscosity & diffusivity

Q4. What is the change in internal energy of 25kmol 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  $[P + (365/V^2)](V - 0.043) = RT$ )

- 22,143 kJ
- 32,143 kJ
- 42,143 kJ
- 52, 143 kJ

Q5. 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  $t^\circ\text{C}$  are given by:

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

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

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 \_\_\_\_\_.

- 52.5% B
- 72.5% B

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- 86.5% B
- 92.5% B