



Questions hold equal mark (5 Mark)

Q1/Answer One of the following:

(A) A gas composed of 20% ethanol and 80% carbon dioxide is at 500 K. What is its pressure if the volume per g mol is 180 cm<sup>3</sup>/g mol? ( Use the compressibility chart)

Component	P <sub>c</sub> (atm)	T <sub>c</sub> (K)
Ethanol	63	516.3
CO <sub>2</sub>	72.9	304.2

(B) A vessel that has a volume of 0.35 m<sup>3</sup> contains 2 kg of a mixture of liquid water and water vapor at equilibrium with a pressure of 450 kPa. What is the quality of the water vapor?

Q2/ Answer One of the following:

(A) What weight of ethane (P<sub>c</sub>=48.2 atm, T<sub>c</sub>= 305.4 K) is contained in a gas cylinder that is 1 ft<sup>3</sup> in volume if the gas is at 100°F and 2000 psig? (Use van der waals' equation)

(B) If a gas at 60°C and 101.6 kPa abs. has a molal humidity of 0.03, determine:

- (a) the relative humidity
- (b) the dewpoint of the gas (in °C)

Q3/Air at 25°C and 100 kPa has a dew point of 16°C. If you want to remove 50% of the initial moisture in the air (at a constant pressure of 100 kPa), to what temperature should you cool the air?

Good Luck