Course Questions Short Test No. 1

Chemical Engineering - Unit Operations II.

	A	B	C	D
1		■		
2			■	
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	A	B	C	D
6	■			
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9	■			
10			■	

Q1. For humid air at constant total pressure, the humidity ratio **H** can be expressed as a function of:

A) Dry-bulb temperature only.
B) Partial pressure of water vapor and total pressure.
C) Relative humidity only.
D) Specific volume only.

Q2. If unsaturated air is cooled sensibly at constant pressure but remains above its dew point, which parameter remains constant?

A) Relative humidity.
B) Wet-bulb temperature.
C) Humidity ratio.
D) Enthalpy.

Q3. The dew point temperature of moist air is defined as the temperature at which:

A) The air becomes saturated upon cooling at constant pressure.
B) The wet-bulb temperature equals the dry-bulb temperature.
C) The enthalpy reaches a minimum value.
D) The humidity ratio becomes zero.

Q4. During ideal adiabatic humidification of unsaturated air:

A) Dry-bulb temperature increases.
B) Humidity ratio decreases.
C) Relative humidity decreases.
D) Enthalpy of moist air remains approximately constant.

Q5. The fundamental driving force for mass transfer during humidification is:

A) Difference between inlet and outlet dry-bulb temperatures.
B) Difference between total pressure and atmospheric pressure.
C) Difference between actual vapor partial pressure and saturation pressure at the interface temperature.
D) Difference in air velocities.

Q6. On a psychrometric chart, a cooling and dehumidification process below the dew point is represented by:

A) A horizontal movement followed by a downward movement along the saturation curve.
B) A vertical upward line.
C) A horizontal line toward lower temperature.
D) A straight line of constant enthalpy.

Q7. The humid heat $\mathbf{c_H}$ of moist air is defined as:

A) The latent heat of vaporization only.
B) The specific heat of dry air only.
C) The enthalpy of saturated steam.
D) The sum of the specific heat of dry air and the vapor contribution weighted by humidity ratio.

Q8. Moist air at 1 atm has: T_{db} = 40 °C, RH = 30%.
The air is cooled at constant pressure to 25 °C. The dew point of the initial state is 18 °C.
Which statement is correct?

A) Condensation occurs throughout the entire cooling process.
B) The humidity ratio remains constant during cooling.
C) Condensation starts at 25 °C.
D) The relative humidity decreases during cooling.

Q9. An air stream moves on the psychrometric chart along a straight line toward higher humidity ratio while its dry-bulb temperature decreases and enthalpy remains approximately constant.
This process corresponds to:

A) Adiabatic humidification (evaporative cooling).
B) Cooling and dehumidification.
C) Sensible heating.
D) Isothermal humidification with external heat supply.

Q10. For moist air at constant total pressure, saturation is reached when:
A) Humid heat becomes zero.
B) Wet-bulb temperature is lower than dry-bulb temperature.
C) Relative humidity equals 100% and partial vapor pressure equals saturation pressure.
D) Enthalpy reaches a maximum value.