

## SOLUTION

NAME: \_\_\_\_\_

This is an open book quiz. You may use a 4-function calculator. An unsigned honors pledge will result in a zero.

1. The coldest spot in a classroom is a corner where the temperature is typically  $18^\circ\text{C}$ . If the building HVAC system maintains the air in the classroom at a relative humidity of 55%, what is the minimum room air temperature that will prevent condensation from occurring in the classroom?

GIVEN:  $\phi_{\text{room}}$ ;  $T_{\text{corner}}$

FIND:  $T_{\text{room}}$

ASSUME:  $\phi_{\text{corner}} = 1$

ANALYSIS:  $\phi_{\text{corner}} = 1.0 = \frac{P_v}{P_g(18^\circ\text{C})} = \frac{P_v}{0.02064 \text{ bar}}$

So,  $P_v = 0.02064 \text{ bar}$

$$\phi_{\text{room}} = \frac{P_v}{P_g(T_{\text{room}})} = \frac{0.02064 \text{ bar}}{P_g(T_{\text{room}})} = 0.55$$

So,  $P_g(T_{\text{room}}) = 0.03753 \text{ bar}$

Interpolating in A-Z

$T(^{\circ}\text{C})$	$P_g(\text{bar})$
27	.03567
( $T_{\text{room}}$ )	0.03753
28	.03782

$T_{\text{room}} = 27.865^\circ\text{C}$

ANS

I HAVE NEITHER PROVIDED OR RECEIVED HELP DURING THIS QUIZ.

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SIGNATURE