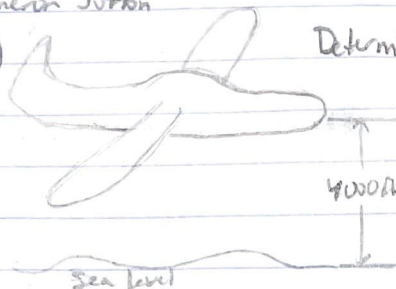


Cameron Sutton

HW1.2

3.11.)



Determine: What would P_{atm} be at 4000 ft above sea level?

11, 41, 90

Given $h = 4000 \text{ ft}$

Design Consideration: open to atmosphere. $P_{\text{sea level}} = 14.7 \text{ psia}$

Assume: 40°F

Solution: $\Delta P = \gamma_{\text{air}} h$

$$\Delta P = (0.0795 \text{ lb/ft}^3)(4000 \text{ ft})$$

$$\Delta P = 318 \text{ lb/ft}^2 \times \frac{\text{ft}^2}{12 \text{ in}} \times \frac{\text{ft}^2}{12 \text{ in}}$$

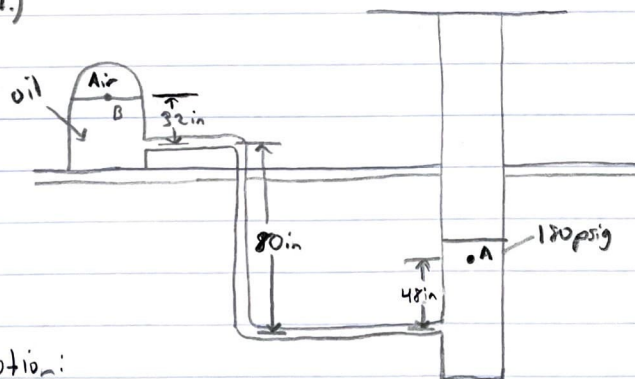
$$\Delta P = 2.21 \text{ psia}$$

$$\Delta P = P_{\text{sea level}} - P_{\text{airplane}}$$

$$2.21 = 14.7 - P_{\text{airplane}}$$

$$P_{\text{airplane}} = 12.49 \text{ psia}$$

3.41.)



Determine:

What must air pressure be if pressure at A must be 180 psig?

Given: $P_A = 180 \text{ psig}$

$SG = 0.90$

Solution:

$$P_A + \gamma_{\text{oil}}(48") - \gamma_{\text{oil}}(112") = P_B$$

$$180 + (0.925)(48") - (0.925)(112") = P_B$$

$$180 + 1.56 - 3.67 = P_B$$

$$177.92 \text{ psig} = P_B$$

$$SG = \frac{\gamma_{\text{oil}}}{\gamma_{\text{w}} @ 40^\circ \text{C}}$$

$$0.90 = \frac{\gamma_{\text{oil}}}{62.4 \text{ lb/ft}^3}$$

$$56.16 \text{ lb/ft}^3 = \gamma_{\text{oil}}$$

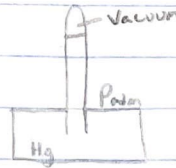
$$0.0325 \text{ lb/in}^3 = \gamma_{\text{oil}}$$

$$0.0325 \text{ lb/in}^3 = \gamma_{\text{oil}}$$

3.90.) Determine: Pressure in mmHg.

Given: $P_{vac} = -68.2 \text{ kPa}$

Conversion: $1 \text{ kPa} = 7.50062 \text{ mmHg}$



Solution: $P_{mmHg} = P_{vac} \times 7.50062 \text{ mmHg}$

$P_{mmHg} = (-68.2)(7.50062)$

$P_{mmHg} = -511.542 \text{ mmHg}$