

**37.61** Olive oil has a dynamic viscosity of  $40cP$  and a specific gravity of **0.92**. What is the kinematic viscosity?

- A.  $4.3 \times 10^{-5} \frac{ft^2}{s}$
- B.  $4.7 \times 10^{-4} \frac{ft^2}{s}$
- C.  $2.0 \times 10^{-3} \frac{ft^2}{s}$
- D.  $1.7 \frac{ft^2}{s}$

Use the **Specific Gravity** to determine the density of the oil.

$$SG = \frac{\rho_{oil}}{\rho_{water}}$$

$$\rho_{oil} = SG \cdot \rho_{water} = (0.92) \left( 62.4 \frac{lb_m}{ft^3} \right) = 57.4 \frac{lb_m}{ft^3}$$

Use the relation between **Kinematic Viscosity** and **Absolute Viscosity** i.e. 'Dynamic Viscosity'. Use **Measurement Relationships** for required unit conversions to align with the answer choices.

$$\nu = \frac{\mu}{\rho}$$

$$\nu = \frac{(40cP) \left( 2.412 \frac{lb_m}{hr \cdot ft \cdot cP} \right) \left( \frac{1hr}{3600s} \right)}{57.4 \frac{lb_m}{ft^3}} = 4.7 \times 10^{-4} \frac{ft^2}{s}$$

**Answer B**