NAME

Fluids-ID

Quiz 5. As a valve is opened, water flows through the diffuser at an increasing flow rate so that the velocity along the centerline is given by

$$\underline{V} = u\hat{\imath} = V_0(1 - e^{-ct})\left(1 - \frac{x}{\ell}\right)\hat{\imath}$$

where V_0, c, and ℓ are constants. If V_0 = 10 ft/s, c = 0.5 1/s and ℓ = 5 ft, determine the acceleration at $x = \ell/2$ = 2.5 ft and t = 2 s.

- Acceleration: $\underline{a} = a_x\hat{\imath} = \left(\frac{\partial u}{\partial t} + u\frac{\partial u}{\partial x} + v\frac{\partial u}{\partial y} + w\frac{\partial u}{\partial z}\right)\hat{\imath}$

Note: Attendance (+2 points), format (+1 point)