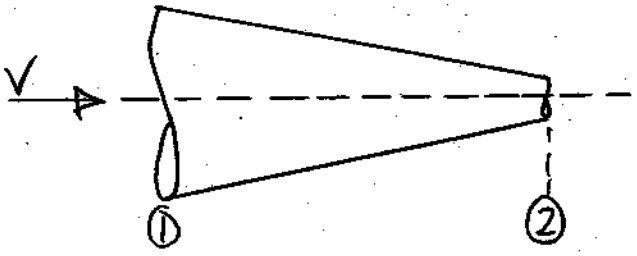
4.10 G: $V_1 = 0.5t$ m/s ; $V_2 = 1.0t$ m/s t(SEC)

F: (a) LOCAL ACCELERATION BETWEEN (1) AND (2)

(b) IS AVG CONVECTIVE ACCELERATION +, 0, −



$$\frac{\partial V}{\partial y} = \frac{\partial V}{\partial z} = \emptyset$$

a) $$\bar{a} = \frac{D\bar{V}}{Dt} = \underbrace{\frac{\partial \bar{V}}{\partial t}}_{\text{LOCAL ACCELERATION}} + \underbrace{u\frac{\partial \bar{V}}{\partial x} + v\frac{\partial \bar{V}}{\partial y} + w\frac{\partial \bar{V}}{\partial z}}_{\text{CONVECTIVE ACCELERATION}}$$

$$a_{L,1} = \frac{\partial V}{\partial t} = \frac{\partial(0.5t)}{\partial t} = 0.5 \text{ m/s}^2$$

$$\boxed{a_{L,1} = 0.5 \text{ m/s}^2}$$

$$a_{L,2} = \frac{\partial V}{\partial t} = \frac{\partial(1.0t)}{\partial t} = 1.0 \text{ m/s}^2$$

$$\boxed{a_{L,2} = 1.0 \text{ m/s}^2}$$

b) $$a_{c,1-2} = u\frac{\partial V}{\partial x} = V\frac{\partial V}{\partial x}$$

$$\left.\begin{array}{l} V \text{ IS + TO RIGHT} > 0 \\ V_2 > V_1 \therefore \frac{\partial V}{\partial x} > 0 \end{array}\right\} \therefore \boxed{a_{c,1-2} > 0}$$

FOR <u>BOTH</u> REASONS