

20-P-KM-AF-010

Curvilinear Motion: ~~Intermediate~~ Beginner

Q: A particle moves with velocity of $\mathbf{v} = \{ A\hat{i} + Bt\hat{j} + [C - t]\hat{k} \} \text{ m/s}$.
What is the position at the following times:
 $t = D, E, F \text{ s}$. What is the acceleration

A: @ time D

position

$$\hat{i} = A \cdot D, \hat{j} = B \cdot \frac{D \cdot D}{2}, \hat{k} = CD - \frac{D^2}{2}$$

acceleration

$$a_x = \frac{dv_x}{dt} = 0 \quad a_y = \frac{dv_y}{dt} = B \quad a_z = \frac{dv_z}{dt} = -1$$

@ time E

$$\hat{i} = A \cdot E, \hat{j} = B \cdot \frac{E^2}{2}, \hat{k} = CE - \frac{E^2}{2}$$

@ time F

$$\hat{i} = A \cdot F, \hat{j} = \frac{B \cdot F^2}{2}, \hat{k} = CF - \frac{F^2}{2}$$