

Name:

Sec.# (7 & 8) ---Quiz (3), Ch# 3 & 4

S.N:

ID# :

KEY

Phys 101 (Term 032)-(F. Enaya)

Show your steps clearly for full credit.

Q.1 Find Q.1 Given the vectors $\mathbf{A} = 3\mathbf{i} + 6\mathbf{j}$, $\mathbf{B} = 15\mathbf{j} + 21\mathbf{k}$. Find the magnitude of vector \mathbf{C} that satisfies equation $2\mathbf{A} + 3\mathbf{C} - \mathbf{B} = 0$.

$$\vec{C} = \frac{1}{3}(\vec{B} - 2\vec{A}) = \frac{1}{3}[(15\mathbf{i} + 21\mathbf{k}) + (-6\mathbf{j} - 12\mathbf{k})]$$

$$\vec{C} = \frac{1}{3}(15\mathbf{i} - 6\mathbf{j} + 9\mathbf{k}) = 5\mathbf{i} - 2\mathbf{j} + 3\mathbf{k}$$

$$|C| = \sqrt{5^2 + (-2)^2 + 3^2} = 6.16$$

Q.2 At $t=0$, a particle moving in the xy plane with a constant acceleration of $\mathbf{a}=(2\mathbf{j} + 4\mathbf{i}) \text{ m/s}^2$ has a velocity $\mathbf{V}_0=(-4\mathbf{j}) \text{ m/s}$ at the origin. Find the speed of the particle at $t=3 \text{ s}$.

$$\mathbf{V} = \mathbf{V}_0 + \mathbf{a}t$$

$$\mathbf{V} = (-4\mathbf{j}) + (2\mathbf{i} + 4\mathbf{j})(3) = 6\mathbf{i} + 8\mathbf{j}$$

$\mathbf{V} = 6\mathbf{i} + 8\mathbf{j}$, this is the final velocity.

To find the speed take the magnitude :

$$|V| = \left| \sqrt{6^2 + 8^2} \right| = 10 \text{ m/s}$$