

Title

$$Q1.) \quad mv = 8260 \text{ kg m/s}$$

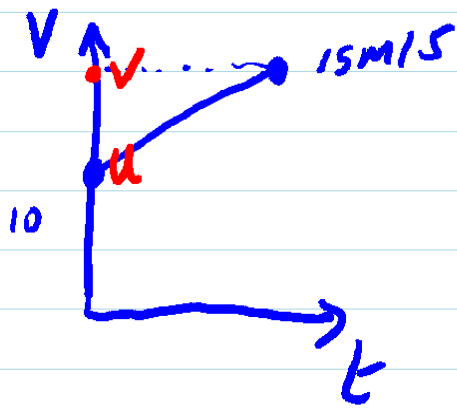
$$Q3.) \quad \text{Momentum } P = mv$$

$$2475 = 165.3 \cdot v$$

$$v = \frac{2475}{165.3} \text{ m/s}$$

EXAMPLES ON AVERAGE ACC

E.g. 1.



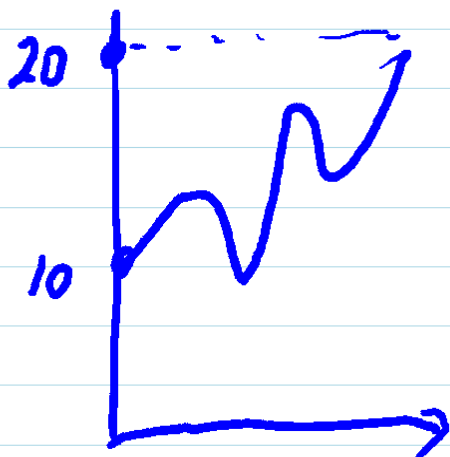
$$a = \frac{\text{change in vel}}{\text{Time}}$$

$$a = \frac{v - u}{t} \quad \text{EXACT}$$

can
only
use
if
smooth acc

$$at = v - u$$

$$\boxed{v = u + at}$$



$$a = \frac{v - u}{t}$$

NOT
EXACT
↓
AVERAGE
ONLY

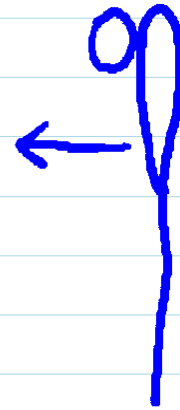
$$\text{Q6.} \quad m = 0.06 \text{ kg}$$

$$u = 0$$

$$v = 33.6 \text{ m/s}$$

$$t = 0.065$$

$$F = ?$$



$$F = ma$$

$$= m \left(\frac{v-u}{t} \right)$$

$$= \frac{0.06(33.6-0)}{0.065}$$

$$F = 33.6 \text{ N}$$

6. A 0.06 kg tennis ball, initially at rest, is hit from the racket with a velocity of 33.6 m/s. If the time that the racket and ball were in contact with each other was 0.06 seconds, then what force was required to move the ball?
7. The same ball from the previous question crossed the net towards the awaiting opponent. The ball reached the opponent with the velocity that it left the original player's racket with. If the ball was again contacting the racket for 0.06 seconds, what force would the second player now have to impart on the ball to return the ball with a velocity of 27.9 m/s? The second player has the same time of contact.

Q7.) $u = 33.6 \text{ m/s}$

$$F = m \frac{(v - u)}{t}$$

$$= 0.06 \left(\frac{-27.9 - 33.6}{0.06} \right)$$

$$= -61.5 \text{ N}$$



$$Q8.) \quad m = 0.08 \text{ kg}$$

$$u = 0$$

$$t = 0.28$$

$$v = 37.6$$

$$F = m \frac{(v-u)}{t} = 10.74 \text{ N}$$

$$Q9.) \quad F = m \frac{(v-u)}{t}$$

$$\textcircled{Ft} = mv - mu$$



Impulse (Ns)

$$I = Ft \quad \text{or} \quad mv - mu$$

$$I = 10.74$$

9. If the ball from question 8, still traveling at the same velocity, is caught by the catcher in a distance of 7.9 cm, what impulse was imparted by the catcher in catching the ball?
10. This time, the catcher did not catch the ball from question 8. Instead the ball was hit to deep center field. The ball contacted the bat for a total of 0.0042 seconds. If the ball left the bat with a velocity of 40.4 m/s, what impulse was imparted by the bat during the hit?

$$\begin{array}{ccc}
 37.6 & & 0 \\
 * & & * \\
 \leftarrow 0.079 \text{ m} \rightarrow & &
 \end{array}$$

$$s = ut + \frac{1}{2}at^2$$

$$v^2 = u^2 + 2as$$

$$0 = (37.6)^2 + 2a(0.079)$$

$$v = u + at$$

$$0 = 37.6 - 8948 \cdot t$$

$$t = \frac{37.6}{8948} = 0.0042 \text{ s}$$

$$0 = 1413.76 + a(0.158)$$

$$a = - \frac{1413.76}{0.158} = -8948$$

$$I = F \cdot t$$