

Answer on Question#40442, Physics, Mechanics | Kinematics | Dynamics

When a golfer hits a ball is in contact with the ball for about 0.0005 seconds and the ball leaves the club with a speed of 70ms^{-1} . The mass of the ball is 46 g. Determine the mean accelerating force.

Solution:

Given:

$$\Delta v = 70 \text{ m/s}$$

$$\Delta t = 0.0005 \text{ s}$$

$$m = 46 \cdot 10^{-3} \text{ kg}$$

For collisions, the mass and change in velocity are often readily measured, but the force during the collision is not. If the time of collision can be measured, then the average force of impact can be calculated.

From Newton's second law

$$F_{mean} = ma = m \frac{\Delta v}{\Delta t}$$

Thus,

$$F_{mean} = m \frac{\Delta v}{\Delta t} = 46 \cdot 10^{-3} \cdot \frac{70}{0.0005} = 6440 \text{ N}$$

Answer. $F_{mean} = 6440 \text{ N}$.