

## Answer on Question #73855, Physics – Mechanics, Relativity

### Question:

Power supplied to a particle of mass 2kg varies with time as  $P = 3t^2 / 2$ . Here  $t$  is in second. If the velocity of the particle at  $t=0$  is  $v=0$ . The velocity of the particle at the time  $t=2$  s will be?

### Solution:

The integral of the power is equal to the total energy transferred during this time:

$$E = \int_{t_1}^{t_2} P \cdot dt = \int_0^2 \frac{3t^2}{2} \cdot dt = \frac{t^3}{2} \Big|_0^2 = 4 \text{ (J)}$$

The particle has 4 J of kinetic energy, so the velocity of the particle is:

$$v = \sqrt{\frac{2E}{m}} = 2 \text{ (m/s)}$$

**Answer:**  $v = 2$  m/s

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