

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: $v = 2 \text{ m/s}$

Answer provided by <https://www.AssignmentExpert.com>