

Mathematics Questions by Topics

Motion and Force

Question 7

Source: K20SM2Q20

Question 7

A particle of mass m kg falls vertically downwards, from rest in a medium which offers air resistance equal to kv^2 newtons, where $v \text{ ms}^{-1}$ is its velocity at a time t seconds. After a time T seconds, its velocity is $V \text{ ms}^{-1}$ and it has travelled a distance of D metres.

Which of the following is **false**?

A. $m \frac{dv}{dt} = mg - kv^2$

B. $D = \int_0^V \frac{mv}{mg - kv^2} dv$

C. $V = \frac{D}{T}$

D. $T = \int_0^V \frac{m}{mg - kv^2} dv$

E. Its limiting or terminal velocity is equal to $\sqrt{\frac{mg}{k}} \text{ ms}^{-1}$.