2021-Ph-H1-Q6

Section: Our Dynamic Universe
Topic: Forces, Energy and Power

Summary:
A motorcycle and rider (total mass 250 kg) decelerate from 16 m/s to rest in 10.0 s. We are asked for the **maximum energy** converted to heat in the brakes.

Solution:
The kinetic energy is fully converted to heat:

$$E = \frac{1}{2}mv^2 = \frac{1}{2} \times 250 \times (16)^2 = 125 \times 256 = 32,000 \text{ J}.$$

Answer: C. 32,000 J

Guidance for Students:

- Brakes convert kinetic energy into heat when stopping.
- Only initial kinetic energy matters if the vehicle stops completely.

Revision Tips:

- $E_k = \frac{1}{2}mv^2$.
- Velocity must be in m/s and mass in kg.
- Time of braking is irrelevant to total energy converted.