

Answer on Question #43274 – Physics – Mechanics | Kinematics | Dynamics

Question.

A 40kg boy runs up a flight of stairs which is 5m high in 5s. His power output is?

- A. 200W
- B. 392W
- C. 1000W
- D. 1568W
- E. 2000W

Given:

$$m = 40 \text{ kg}$$

$$h = 5 \text{ m}$$

$$t = 5 \text{ s}$$

Find:

$$P = ?$$

Solution.

By definition the power is the rate of doing work:

$$P = \frac{A}{t}$$

A is the work done;

t is the time.

In our case, the work done is moving the boy against the forces of gravity. So,

$$A = mgh$$

$g = 9.8 \frac{\text{m}}{\text{s}^2}$ is the gravitational acceleration.

Therefore,

$$P = \frac{A}{t} = \frac{mgh}{t}$$

Calculate:

$$P = \frac{40 \cdot 9.8 \cdot 5}{5} = 392 \text{ W}$$

Answer.

B. 392W