



A car is climbing up a hill with a constant speed v .

The frictional force is $f = \mu N$.

The weight of car is mg .

The maximum power is P_{max} .

Find the maximum speed of the car.

- A) $v_{max} \simeq \frac{P_{max}}{mg \sin \theta + \mu mg \cos \theta}$.
- B) $v_{max} \simeq \frac{P_{max}}{mg \sin \theta - \mu mg \cos \theta}$.
- C) $v_{max} \simeq \frac{P_{max}}{mg \sin \theta}$.
- D) $v_{max} \simeq \frac{P_{max}}{\mu mg \cos \theta}$.

Explanation: For the car moving uphill, $\mu mg \cos \theta$ is pointing downhill. Since the car is moving with a constant speed, the net uphill force equals the downhill force; i.e., $F = mg \sin \theta + \mu mg \cos \theta$ and $v_{max} = \frac{P_{max}}{F}$, so

$$v_{max} \simeq \frac{P_{max}}{mg \sin \theta + \mu mg \cos \theta}.$$

Answer **A**.