

Answer on Question #41291, Physics, Mechanics

Question:

An engine provides 5.0 kN of force to keep a 1600-kg vehicle moving at a uniform speed. (Air resistance is negligible.) The coefficient of rolling friction between the tires and the road surface is ____.

Answer:

Vehicle moving at a uniform speed therefore acceleration equals 0. Assuming Newton's first law of motion:

$$F = F_{fr}$$

where F_{fr} is the friction force, F is the force the engine.

Force of friction equals:

$$F_{fr} = \mu N = \mu mg$$

where N is normal force, mg is weight of the vehicle.

Coefficient of rolling friction equals:

$$\mu = \frac{F_{fr}}{mg} = \frac{F}{mg} = \frac{5000}{1600 \cdot 9.8} = 0.32$$

Answer: 0.32