

Answer on Question #48634, Physics, Other

In a performance test, each of two cars takes 8.4 s to accelerate from rest to 26 m/s. Car A has a mass of 1378 kg, and car B has a mass of 1899 kg. Find the net average force that acts on (a) car A and (b) car B during the test.

Solution:

The magnitude of the net force is equated to the product of the mass times the acceleration:

$$F = ma$$

The acceleration is

$$a = \frac{v_f - v_i}{t}$$

The symbol a stands for the acceleration of the object. And the symbol v stands for the velocity of the object; a subscript of i after the v indicates that the velocity value is the initial velocity value and a subscript of f indicates that the velocity value is the final velocity value.

Thus, for car A:

$$F_A = 1378 * \frac{26}{8.4} = 4265.24 \text{ N}$$

Thus, for car B:

$$F_B = 1899 * \frac{26}{8.4} = 5877.86 \text{ N}$$

Answer: a) $F_A = 4265.24 \text{ N}$; b) $F_B = 5877.86 \text{ N}$.