Answer on Question #51945, Physics, Other

Question:

The exhaust gas of a rocket is expelled at the rate of 1300 kg/s, at the velocity of 50 000 m/s. Find the thrust on the rocket in newtons

Answer:

Newton's second law of motion can be expressed as:

$$F = \frac{dp}{dt}$$

For the rocket:

$$\frac{dp}{dt} = \frac{d}{dt}(mv) = v\frac{dm}{dt}$$

Therefore:

$$F = v\frac{dm}{dt} = 50000\frac{m}{s}\ 1300\frac{kg}{s} = 65000000\ N = 6.5 \cdot 10^7\ N$$

Answer: $6.5 \cdot 10^7\ N$