A rocket of mass 5700kg ejects mass at a constant rate of 15kg/s with constant speed of 12km/s. The acceleration of the rocket 1 minute after the blast is (g=10m/s2)

1.34.9m/s2

2.27.5m/s2

3.3.50m/s2

13.5m/s2

Solution

$$m = m_0 - \frac{dm}{dt}t \rightarrow m(1min) = 5700 - 15 * 60 = 4800kg.$$

For the Second Newton's law

$$ma = \frac{dm}{dt}V - mg$$

$$a = \frac{dm}{dt} * \frac{V}{m} - g = \frac{12000}{4800} * 15 - 10 = 27.5\frac{m}{s^2}$$

Right answer is 2) $\mathbf{27.5\frac{m}{s^2}}$.