

### Answer on Question #55775-Physics-Classical Mechanics

A satellite in force free space sweeps stationary interplanetary dust at a rate of  $dM/dt = kV$  where  $M$  is mass and  $V$  is the speed of satellite and  $k$  is a constant. Tangential acceleration of satellite is

Options are-

(1)  $-kV^2/2M$

(2)  $-kV^2$

(3)  $-2kV^2/M$

(4)  $-kV^2/M$

### Solution

Thrust on the satellite,

$$F = -V \frac{dM}{dt} = -V \cdot kV = -kV^2.$$

Tangential acceleration of satellite is

$$\frac{F}{M} = \frac{-kV^2}{M}.$$

**Answer: 4)  $-kV^2/M$ .**

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