

### Question 32553

If block is stationary with respect to conveyer which is accelerating with  $a = 1 \frac{m}{s^2}$ , then in laboratory

frame of reference the block is moving upwards with the same acceleration. In this case, the friction force is causing the object to accelerate.

For motion over inclined plane, projection on axis, which is perpendicular to the surface of the plane gives:  $N = mg \cos \varphi$ ,  $\varphi$  is the angle of inclination.

Projection over axis, parallel to the plane, gives:

$ma = F_f - mg \sin \varphi$ .  $F_f$  is the friction force, which is calculated as  $F_f = \mu N = \mu mg \cos \varphi$  ( $\mu$  is the friction coefficient one needs to find).

Hence,  $ma = \mu mg \cos \varphi - mg \sin \varphi \Rightarrow \mu = m \frac{(a + g \sin \varphi)}{mg \cos \varphi} = \frac{a + g \sin \varphi}{g \cos \varphi} = 0.68$ .