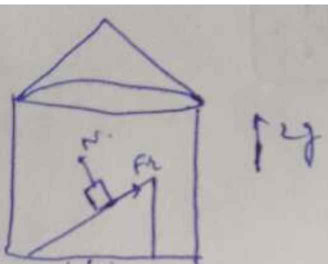
A rocket is fired vertically from the earth with an acceleration of 2g, where g is the gravitational acceleration. On an inclined plane inside the rocket, making an angle θ with the horizontal, a point object of mass m is kept. The minimum coefficient of friction μ_{min} between the mass and the inclined surface such that the mass does not move is: **[JEE-Main Online-2016]**

(1) $2 \tan \theta$ (2) $3 \tan \theta$ (3) $\tan \theta$ (4) $\tan 2\theta$

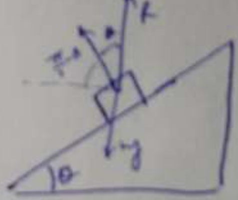
sol n.



take Reaction = N + F_r

which is θ from N in limiting case

so $R - mg = (2g)m$.



$R = 3mg$.

~~so, $R\cos\theta = N$~~

$R^2 = N^2 + \mu^2 N^2$

~~$N^2(1+\tan^2\theta) = R^2$~~

$\sqrt{\frac{9m^2g^2}{1+\tan^2\theta}} = N$.

we solved extra.

we only needed direction of R to balance mg.

so, $\boxed{\tan\theta = \mu}$

(3)