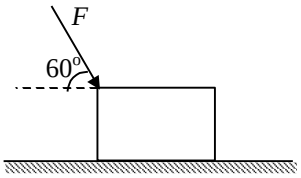
A block of mass $\sqrt{3}$ kg is placed on a rough horizontal surface having coeff. of friction $\mu = \frac{1}{2\sqrt{3}}$. A force is applied as shown in the figure. Minimum force required just to slide the block is (g = 10 m/s^2)



(a) 20/3 N (b) 20 N
(c) 5 N (d) 10 N

Solution

We have, $N = F\sin 60^\circ + mg$

Also, for force F to be minimum, $F\cos 60^\circ = \mu N$

$$\therefore \frac{F}{2} = \mu(F\sin 60^\circ + mg) = \frac{1}{2\sqrt{3}}\left(\frac{\sqrt{3}}{2}F + 10\sqrt{3}\right)$$

$\Rightarrow$ F = 20 N

Hence, (b)