Question

4)a block of mass m is placed on a smooth turntable at a distance of 20cm from the centre.
a string is tied to the block and its other end passed through a gole in the centre of the table.
A 2nd block of mass m is suspended from the free end of the string as shown in fig.
At what angular speed should turntable rotate
so that the block placed on it should remain at rest on its surface?

Solution

The first block is affected by centrifugal force of $\frac{mV^2}{R} = mR\omega^2$, and the second one of mg. These forces are to be equal:

$$mR\omega^2 = mg \implies \omega = \sqrt{\frac{g}{R}} = \sqrt{\frac{9.8}{0.2}} = \sqrt{49} = 7 \ \frac{rad}{s};$$

Answer

$\omega = 7\frac{rad}{s};$