

3.

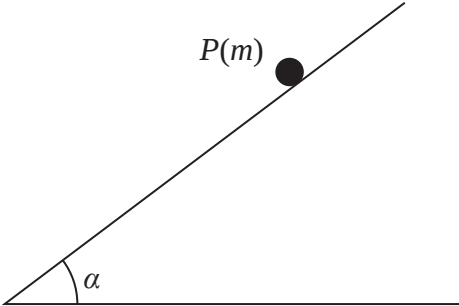


Figure 3

A particle P of mass m is held at rest at a point on a rough inclined plane, as shown in Figure 3.

It is given that

- the plane is inclined to the horizontal at an angle α , where $\tan \alpha = \frac{5}{12}$
- the coefficient of friction between P and the plane is μ , where $\mu < \frac{5}{12}$

The particle P is released from rest and slides down the plane.
Air resistance is modelled as being negligible.

Using the model,

(a) find, in terms of m and g , the magnitude of the normal reaction of the plane on P , (2)

(b) show that, as P slides down the plane, the acceleration of P down the plane is

$$\frac{1}{13}g(5 - 12\mu)$$
(4)

(c) State what would happen to P if it is released from rest but $\mu \geq \frac{5}{12}$ (1)