5.

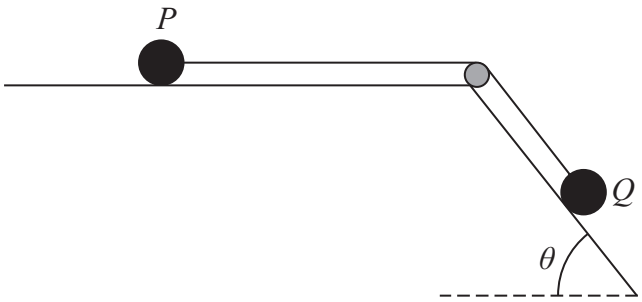


Figure 2

Two particles P and Q have masses 0.1 kg and 0.5 kg respectively.

The particles are attached to the ends of a light inextensible string.

Particle P is held at rest on a rough horizontal table.

The string lies along the table and passes over a small smooth pulley which is fixed to the edge of the table.

Particle Q is at rest on a smooth plane which is inclined to the horizontal at an angle θ, where $\tan\theta = \frac{4}{3}$

The string lies in the vertical plane which contains the pulley and a line of greatest slope of the inclined plane, as shown in Figure 2.

Particle P is released from rest with the string taut.

During the first 0.5 s of the motion P does not reach the pulley and Q moves 0.75 m down the plane.

(a) Find the tension in the string during the first 0.5 s of the motion.

(6)

(b) Find the coefficient of friction between P and the table.

(5)

(Total for Question 5 is 11 marks)