

- 11** A block of mass 2 kg is placed on a rough horizontal table. A light inextensible string attached to the block passes over a smooth pulley attached to the edge of the table. The other end of the string is attached to a sphere of mass 0.8 kg which hangs freely.

The part of the string between the block and the pulley is horizontal. The coefficient of friction between the table and the block is 0.35 . The system is released from rest.

- (a) Draw a force diagram showing all the forces on the block and the sphere. [3]
- (b) Write down the equations of motion for the block and the sphere. [2]
- (c) Show that the acceleration of the system is 0.35 m s^{-2} . [4]
- (d) Calculate the time for the block to slide the first 0.5 m . Assume the block does not reach the pulley. [2]