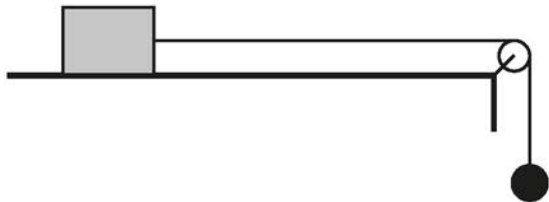


- 11** A block of mass  $3\text{ kg}$  is at rest on a smooth horizontal table. It is attached to a light inextensible string which passes over a smooth pulley. This part of the string is horizontal. A sphere of mass  $1.2\text{ kg}$  is attached to the other end of the string. The sphere hangs with this part of the string vertical as shown in the diagram. A horizontal force of magnitude  $F\text{ N}$  is applied to the block to prevent motion.



- (a)** Complete the copy of the diagram in the Printed Answer Booklet to show all the forces acting on the block and the sphere. **[2]**
- (b)** Find the value of  $F$ . **[2]**

The force  $F\text{ N}$  is removed, and the system begins to move.

- (c)** The equation of motion of the block is  $T = 3a$ , where  $T\text{ N}$  is the tension in the string and  $a\text{ ms}^{-2}$  is the acceleration of the block.

Write down the equation of motion of the sphere.

**[1]**

- (d)** Find the value of  $T$ .

**[2]**