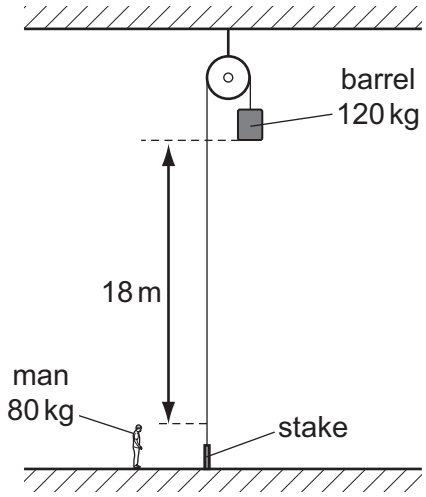
10 The diagram shows a barrel suspended from a frictionless pulley on a building. The rope supporting the barrel goes over the pulley and is secured to a stake at the bottom of the building.



A man stands close to the stake. The bottom of the barrel is 18 m above the man's head. The mass of the barrel is 120 kg and the mass of the man is 80 kg.

The man keeps hold of the rope after untying it from the stake and is lifted upwards as the barrel falls.

What is the man's upward speed when his head is level with the bottom of the barrel? (Use $g = 10\,m\,s^{-2}$.)

A $6\,m\,s^{-1}$ **B** $8\,m\,s^{-1}$ **C** $13\,m\,s^{-1}$ **D** $19\,m\,s^{-1}$

Space for working