

A and B are two fixed points on a vertical axis with A 0.6 m above B . A particle P of mass 0.3 kg is attached to A by a light inextensible string of length 0.5 m. The particle P is attached to B by a light elastic string with modulus of elasticity 46 N. The particle P moves with constant angular speed 8 rad s^{-1} in a horizontal circle with centre at the mid-point of AB .

(i) Find the speed of P . [2]

(ii) Calculate the tension in the string BP and hence find the natural length of this string. [7]