1. A cylindrical rod has a radius of 1.0 cm and length 1.0 m. It is made up of two sections, each of length 0.5 m. The material of one section is zinc and that of the other section is copper. The end of the rod made of zinc is pivoted to a fixed point O. The rod is first held so that it is horizontal and then released. Determine the angular velocity of the rod when it is in the vertical position.

   [Densities : zinc : 7135 kg m^{-1} ; copper : 8940 kg m^{-1}] [10 marks]