

An object consists of a uniform solid circular cone, of vertical height  $4r$  and radius  $3r$ , and a uniform solid cylinder, of height  $4r$  and radius  $3r$ . The circular base of the cone and one of the circular faces of the cylinder are joined together so that they coincide. The cone and the cylinder are made of the same material.

- (a) Find the distance of the centre of mass of the object from the end of the cylinder that is not attached to the cone. [4]
- (b) Show that the object can rest in equilibrium with the curved surface of the cone in contact with a horizontal surface. [3]