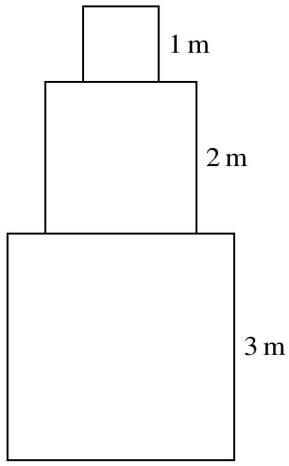

A uniform object is made by joining together three solid cubes with edges 3 m, 2 m and 1 m. The object has an axis of symmetry, with the cubes stacked vertically and the cube of edge 2 m between the other two cubes (see diagram).

(i) Calculate the distance of the centre of mass of the object above the base of the largest cube. [3]

The smallest cube is now removed from the object. It is replaced by a heavier uniform cube with 1 m edges which is made of a different material. The centre of mass of the object is now at the base of the 2 m cube.

(ii) Find the ratio of the masses of the two cubes of edge 1 m. [3]