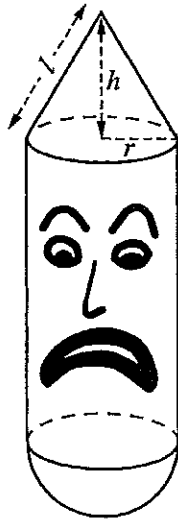


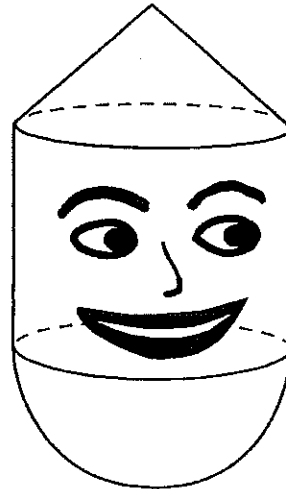
Surface Area/ Mass - 2

Oct 01 Paper 4

7



GRUMPY GUY



HAPPY HAL

NOT TO
SCALE

Grumpy Guy and Happy Hal are children's toys. Each is made from a solid hemisphere, a cylinder and a cone.

[The volume of a sphere, radius r , is $\frac{4}{3}\pi r^3$ and the surface area of a sphere is $4\pi r^2$.

The volume of a cone, base radius r and perpendicular height h is $\frac{1}{3}\pi r^2 h$ and the surface area of a cone is $\pi r l$ where l is the **slant** height.]

- (a) Grumpy Guy has a radius of 3 cm. The height of his cylinder is 7 cm and the **perpendicular** height, h , of his cone is 4 cm.

Calculate for Guy

- (i) his volume, [4]
 (ii) his surface area. [5]

- (b) Happy Hal has a radius of x cm. The height of his cylinder is x cm and the **perpendicular** height of his cone is also x cm.

Find for Hal

- (i) his volume in terms of π and x , [3]
 (ii) his volume when $x = 5$. [1]

- (c) Happy Hal is made from two materials. The hemisphere is made from a heavy material and the rest from a lighter material.

The **mass** of the hemisphere is half the mass of the whole toy.

Find, in its simplest form, the ratio

mass of hemisphere : mass of cylinder : mass of cone. [3]