

6

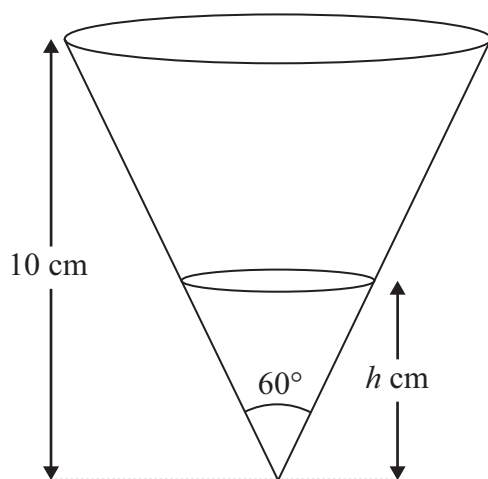


Diagram **NOT**  
accurately drawn

**Figure 3**

A container in the shape of a right circular cone of height 10 cm is fixed with its axis of symmetry vertical. The vertical angle of the container is  $60^\circ$ , as shown in Figure 3. Water is dripping out of the container at a constant rate of  $2 \text{ cm}^3/\text{s}$ . At time  $t = 0$  the container is full of water. At time  $t$  seconds the depth of water remaining is  $h$  cm.

- (a) Show that  $h = \left[ 1000 - \frac{18t}{\pi} \right]^{\frac{1}{3}}$  (6)
- (b) Find, in  $\text{cm}^2/\text{s}$ , to 3 significant figures, the rate of change of the area of the surface of the water when  $t = 15$  (6)



**Question 6 continued**

This image shows a full page of white paper with horizontal dotted lines. The lines are evenly spaced and run across the width of the page, providing a guide for handwriting or typing. There are no margins, text, or other markings on the page.



**Question 6 continued**

**(Total for Question 6 is 12 marks)**

