6

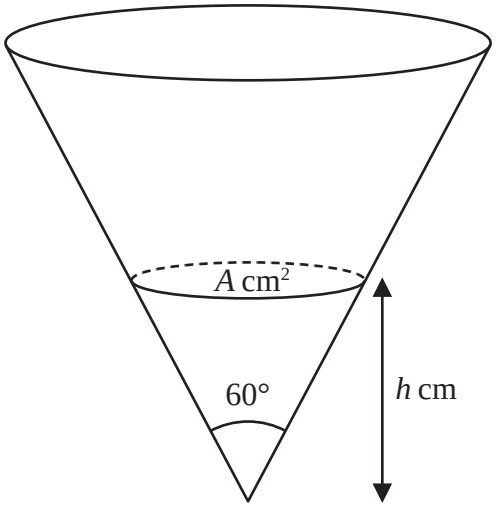

Diagram **NOT** accurately drawn

Figure 4

Figure 4 shows a container in the shape of a right circular cone.
The container is fixed with its axis of symmetry vertical.
The vertical angle of the container is 60º as shown in the diagram.

At time t seconds, $t > 0$, the height of oil in the container is h cm and the volume of oil in the container is V cm^3

(a) Show that $V = \frac{1}{9}\pi h^3$

(3)

At time t seconds the surface area of oil in the container is A cm^2, as shown in Figure 4

Oil is dripping out of the bottom of the container at a constant rate of 4 cm^3/s.

(b) Find the exact rate of change, in cm^2/s, of the surface area of oil in the container when $h = 24$

(8)

Question 6 continued

Question 6 continued

Question 6 continued

(Total for Question 6 is 11 marks)