AI1110 assignment1

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Question 6

(b) A conical tent is to accommodate 77 persons. Each person must have $16m^3$ of air to breathe. Given the radius of the tent as $7m$ find the height of the tent and also its curved surface area.

Solution:

Given a conical tent which can accommodate 77 persons and each person must have $16m^3$ of air to breathe.
so the volume of conical tent is,
$v = 77 \times 16m^3$

we know that volume of conical tent is same as a cone having radius 'r',height 'h',
$v = \frac{\pi r^2 h}{3}$

from the question we are given radius of cone,
r = 7 m
height of cone is
$h = \frac{3v}{\pi r^2}$
By substituting values we can get,
$h = 24m$

Now we know radius and height so we can find lateral height 'l' which is given by,

$$l = \sqrt{r^2 + h^2}$$
$$\Rightarrow l = \sqrt{7^2 + 24^2}$$
$$\Rightarrow l = 25m$$

we know that lateral/curved surface area 's' of a cone is given by,

$$s = \pi \times r \times l$$
$$\Rightarrow s = \frac{22}{7} \times 7 \times 25$$
$$\Rightarrow s = 550m^2$$

Hence the curved surface area is $550m^2$.

The output of the program used to find and verify these numbers is:

```
PS C:\Users\Bhargava ram\Desktop\STUDY\sem2\AI1110\assignment1\codes> gcc main.c
PS C:\Users\Bhargava ram\Desktop\STUDY\sem2\AI1110\assignment1\codes> ./a.exe
Height of the tent is 24m
curved surface area of the conical tent is 550.00m2
```