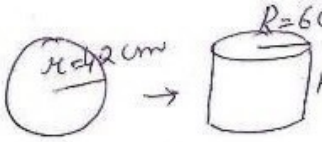
ex 13.3

① 

vol. of cyl = vol of sph.

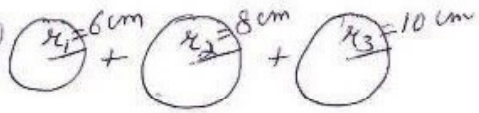
$\pi R^2 H = \frac{4}{3}\pi r^3$

$\frac{22}{7} \times 6 \times 6 \times H = \frac{4}{3} \times 4.2 \times 4.2 \times 4.2$

$\Rightarrow H = 1.4^3$

$= 2.744$

∴ height of cyl. = 2.744 cm

② 

$=$ 

vol of new sphere = vol of three given sph.

$\frac{4}{3}\pi r_4^3 = \frac{4}{3}\pi (r_1^3 + r_2^3 + r_3^3)$

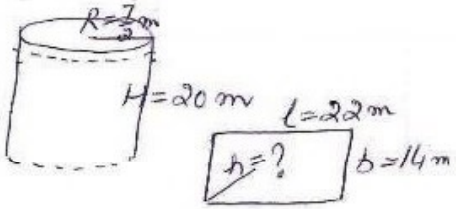
$= 6^3 + 8^3 + 10^3$

$= 216 + 512 + 1000$

$= 1728$

$r_4 = \sqrt[3]{1728}$

$= 12$ cm

③ 

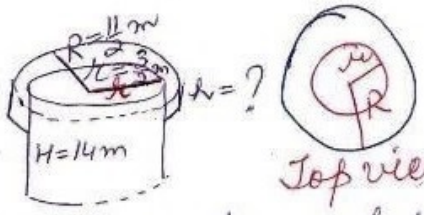
vol of earth spread = vol of earth taken out

$\pi R^2 H = lbh$

$\frac{22}{7} \times \frac{7}{2} \times \frac{7}{2} \times 20 = 22 \times 14 \times h$

$\Rightarrow h = \frac{10}{4}$

$= 2.5$ m

④ 

vol of earth dug = vol of earth spread

$\pi r^2 H = \pi h (R^2 - r^2)$

$\frac{3}{2} \times \frac{3}{2} \times 14 = h\left[\left(\frac{11}{2}\right)^2 - \left(\frac{3}{2}\right)^2\right]$

$\Rightarrow \frac{3 \times 3 \times 7}{2} = h \times \frac{8}{2} \times \frac{14}{2}$ [using $a^2-b = (a-b)(a+b)$]

$\Rightarrow \frac{9}{8} = h$

$\Rightarrow h = 1.125$ m