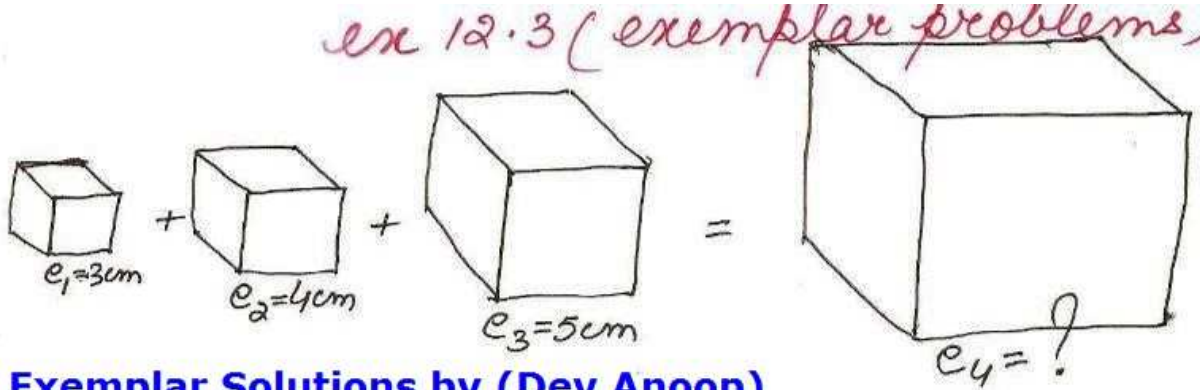
① 

volume of new cube = Sum of volumes of three given cube

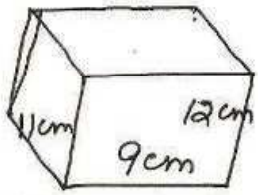
$e_4^3 = e_1^3 + e_2^3 + e_3^3$

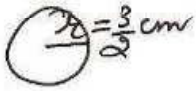
$= 3^3 + 4^3 + 5^3$

$= 27 + 64 + 125$

$e_4 = \sqrt[3]{216}$

$= 6$ cm

② 

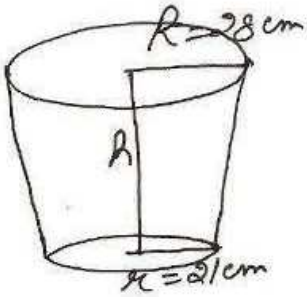


no. of shots $= \dfrac{lbh}{\frac{4}{3}\pi r^3}$

$= \dfrac{9 \times 11 \times 12}{\frac{4}{3} \times \frac{22}{7} \times \frac{3}{2} \times \frac{3}{2} \times \frac{3}{2}}$

$= \dfrac{9 \times 11 \times 12 \times 3 \times 7 \times 2 \times 2 \times 2}{4 \times 22 \times 3 \times 3 \times 3}$

$= 84$

③ 

capacity of bucket $= 28.490\ l$

$= 28490\ cm^3$

$\frac{1}{3}\pi h(r^2 + R^2 + rR) = 28490$

$\frac{1}{3} \times \frac{22}{7} h(21^2 + 28^2 + 21 \times 28) = 28490$

$\Rightarrow \frac{22}{21} h \times 7 \times 7 (9 + 16 + 12) = 28490$

$\Rightarrow \frac{7}{3} h \times 37 = 1295$

$\Rightarrow h = 15$

$\therefore$ height of bucket $= 15$ cm