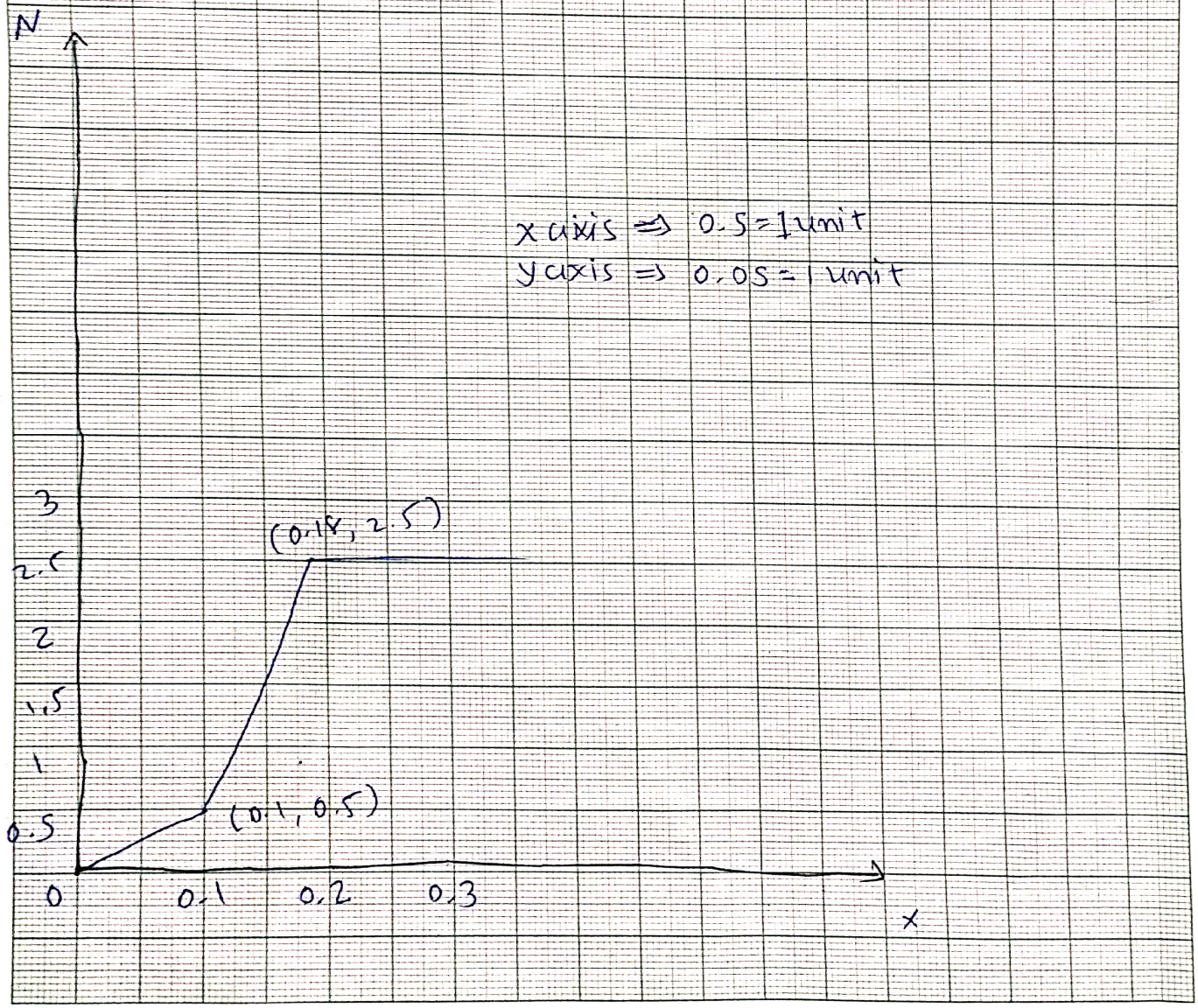
Vatsal shingala MT2 Ch21btech11027



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MT 2

For first line $q = 0$

$N = P_{DC}$

given $t = 1.68\,h$

$\frac{W}{a} = 7\,kg$

$$1.68 = \frac{W_s}{a}\int_{0.03}^{0.1} \frac{dx}{Px}$$

$$1.68 = 7 \times \frac{1}{P} \ln\left(\frac{0.1}{0.03}\right)$$

$$P = 5.01$$

so eqn of 1st line

$N = 5.01\,x \approx 0.5\,x$

at $x = 0.1$ & $N = 0.5$

eqn of 2nd line $N = 2.5x - 2$

so, time for drying from $x_i = 0.35$ to $x_f = 0.01$

$$t = \frac{W_s(x_i - x_{c_1})}{aN_c} + \frac{W_s}{a}\int_{x_{c_2}}^{x_{c_1}} \frac{dx}{25x - 2} + \frac{W_s}{a}\int_{x_f}^{x_{c_2}} \frac{dx}{5x}$$

$$= \frac{7(0.35 - 0.18)}{2.5} + \frac{7}{25}\ln\left(\frac{2.5 \times 0.18 - 2}{25 \times 0.1 - 2}\right) + \frac{7}{5}\ln\left(\frac{0.5}{0.05}\right)$$

$$= 0.476 + 0.45 + 3.22$$

$$= 4.15\,hr$$

$\therefore$ time for drying $= 4.15\,hr$