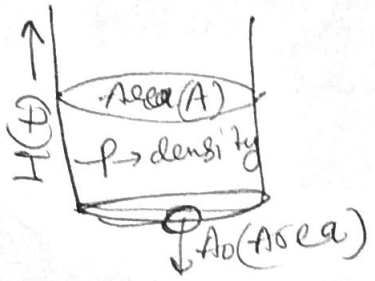
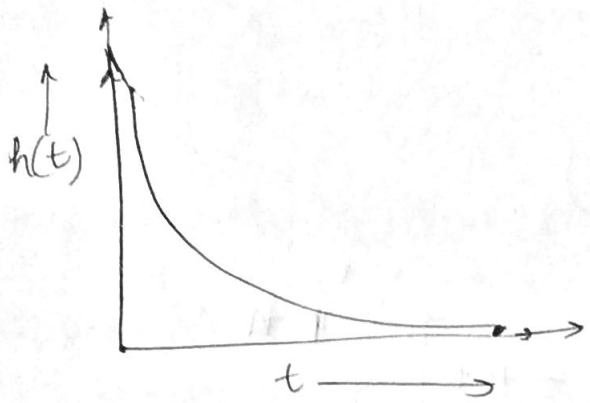
Q) 2



a)



h(t) is decreasing function of time can't be linear because height drops slower as the liquid empty the bottle initially it decrease faster than it slows down to zero eventually

b) Assuming incompressible liquid

$(A V_1 = A_0 V_2)$ → principle of continuity surface.

V_1 & V_2 are velocity of liquid at the 2 cross sections

$q = K h^n$

(can't be constant as height would decrease linearly)

So it is seems a reasonable approximation

$n \neq 1$

because height decrease exponentially & take inf time to competele which is not the case in real world.