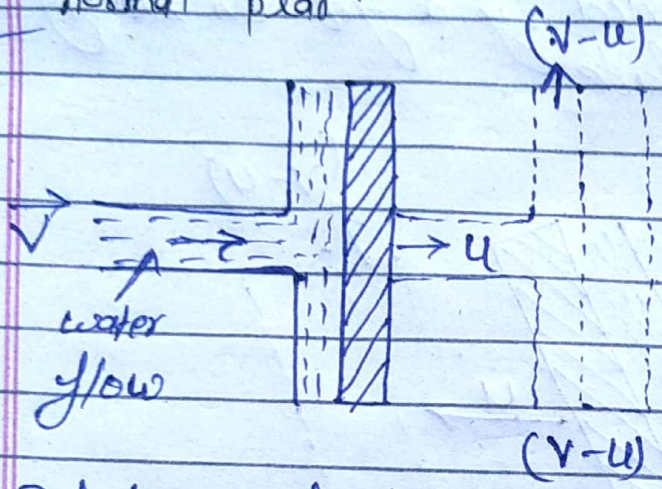
Q.2 Force exerted by a jet on moving normal plat



Relative velocity of jet with respect to plate = (V-u)

Mass of water striking the plate/sec
= ρ × Area of jet × Relative velocity
= ρa(V-u)

Force exerted by the ~~the~~ jet on the moving plate in direction of jet

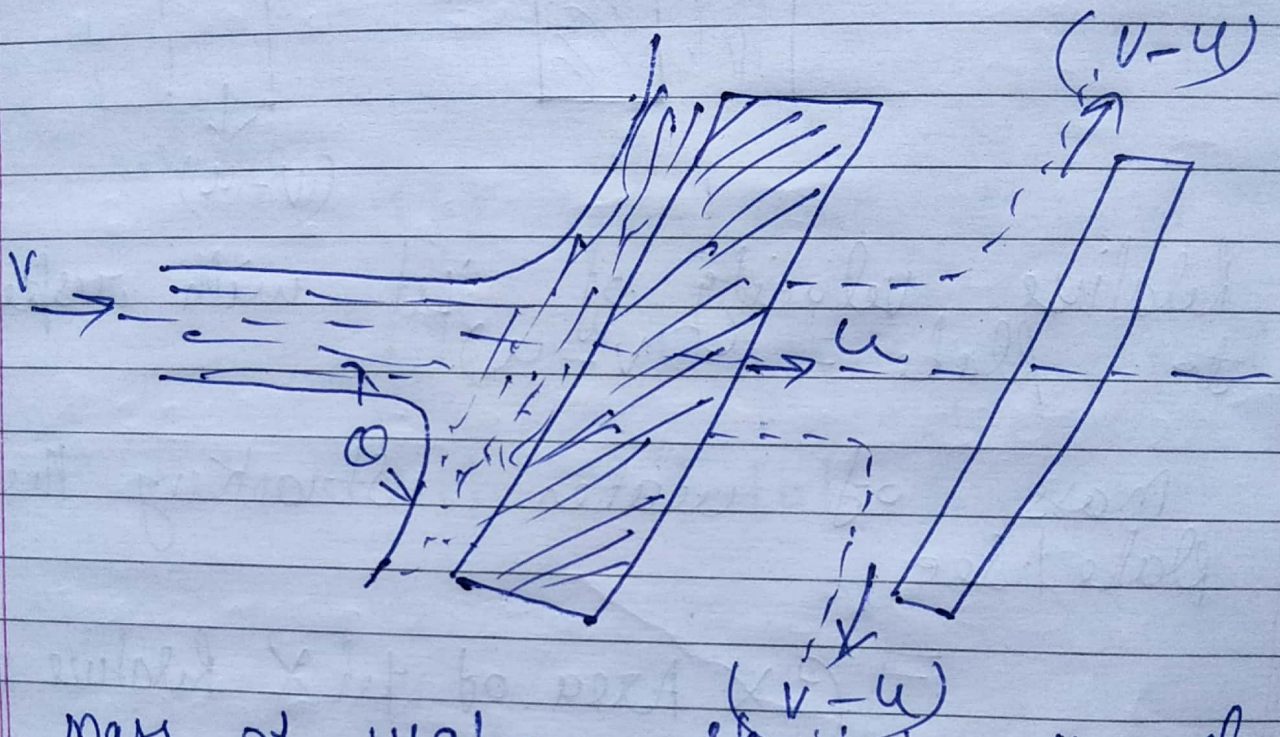
F_x = mass of water striking per sec × [change in velocity]

F_x = $\frac{\text{mass}}{\text{Time}}$ [Initial velocity with water strikes]

$F_x = \rho a(V-u)[(V-u)-0]$

$$\boxed{F_x = \rho a(V-V)^2}$$

ii) Flate plate Inclined to the jet :->



(1) Mass of water striking the plate per sec.

= ρ × Area of jet × Relative velocity

= ρa (v-u)

and = (v-u) Sinθ

$$F_n = \rho a (v-u)[(v-u)\sin\theta - 0]$$

$$F_n = \rho a (v-u)^2 \sin\theta.$$

(2) Force exerted in x-direction by the jet.

$$F_x = F_n \sin\theta$$

$$= \rho a (v-u)^2 \sin\theta \times \sin\theta$$

$$= \rho a (v-u)^2 \sin^2\theta.$$

(3) Force exerted in y-direction by the jet;

$$F_y = F_n \cos\theta.$$

$$= \rho a (v-u)^2 \sin\theta \times \cos\theta.$$

$$\boxed{F_y = \rho a (v-u)^2 \sin\theta \cos\theta}$$