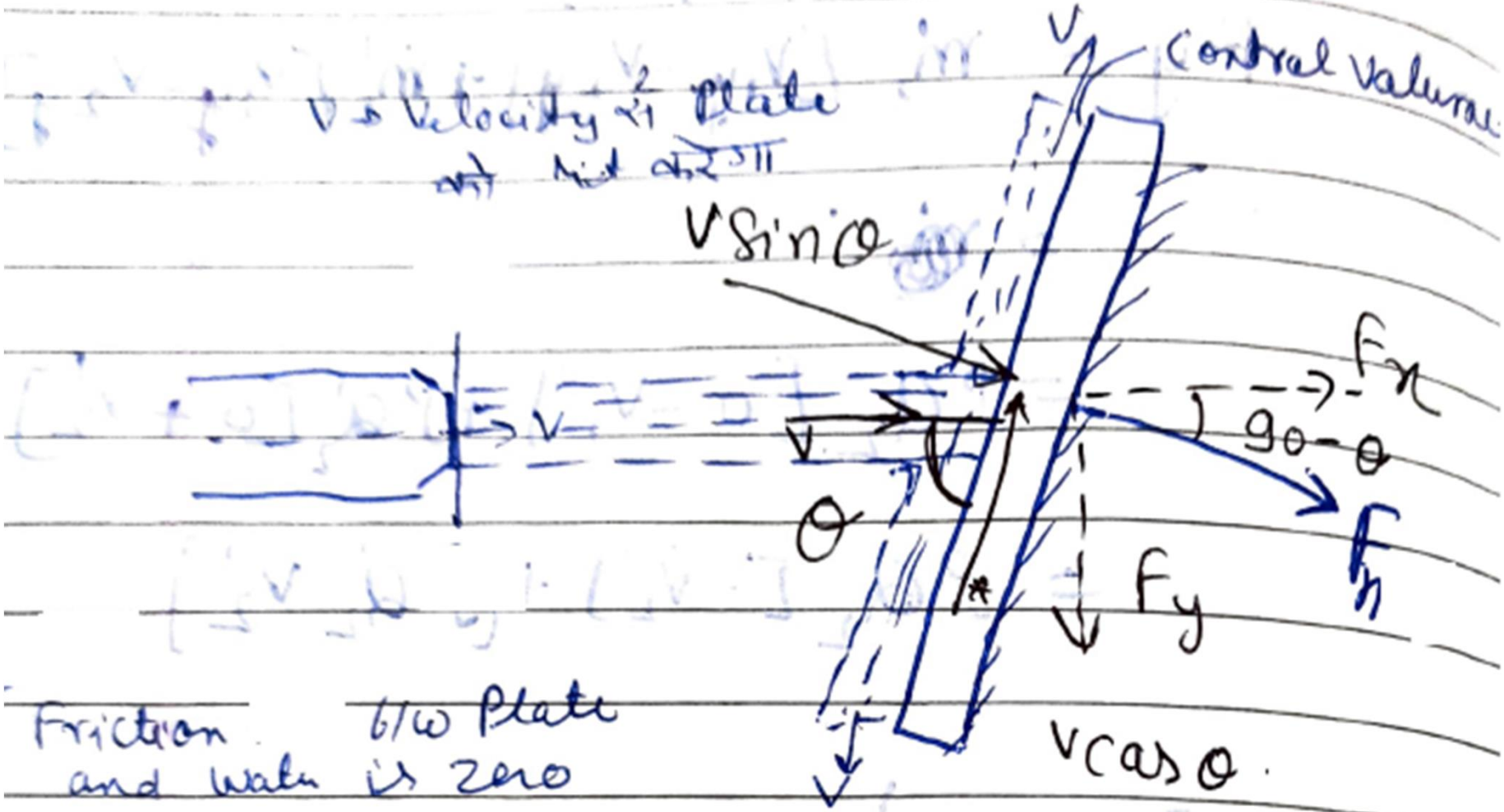
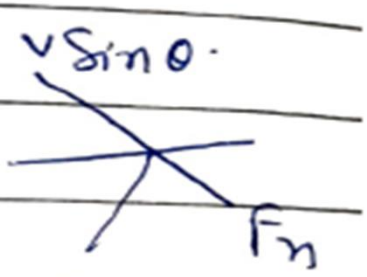
② Force Exerted by Jet on Stationary Inclined Flat Plate



Friction b/w Plate and Water is Zero

F_n Force Exerted by Jet on plate in direction normal to the plate.



Impuls momentEq^n

$$F_n = m^\circ [V_{1n} - V_{2n}]$$

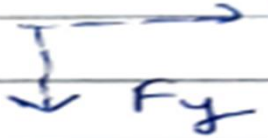
V_{1n} → initial velocity of jet in n direction

V_{2n} = Final " " "

$$F_n = \rho A V [V \sin\theta - 0]$$

$$\boxed{F_n = \rho A V^2 \sin\theta}$$

F_n resolved in two direction x & y.



$$F_x = F_n \cos(90 - \theta)$$

$$= F_n \sin\theta$$

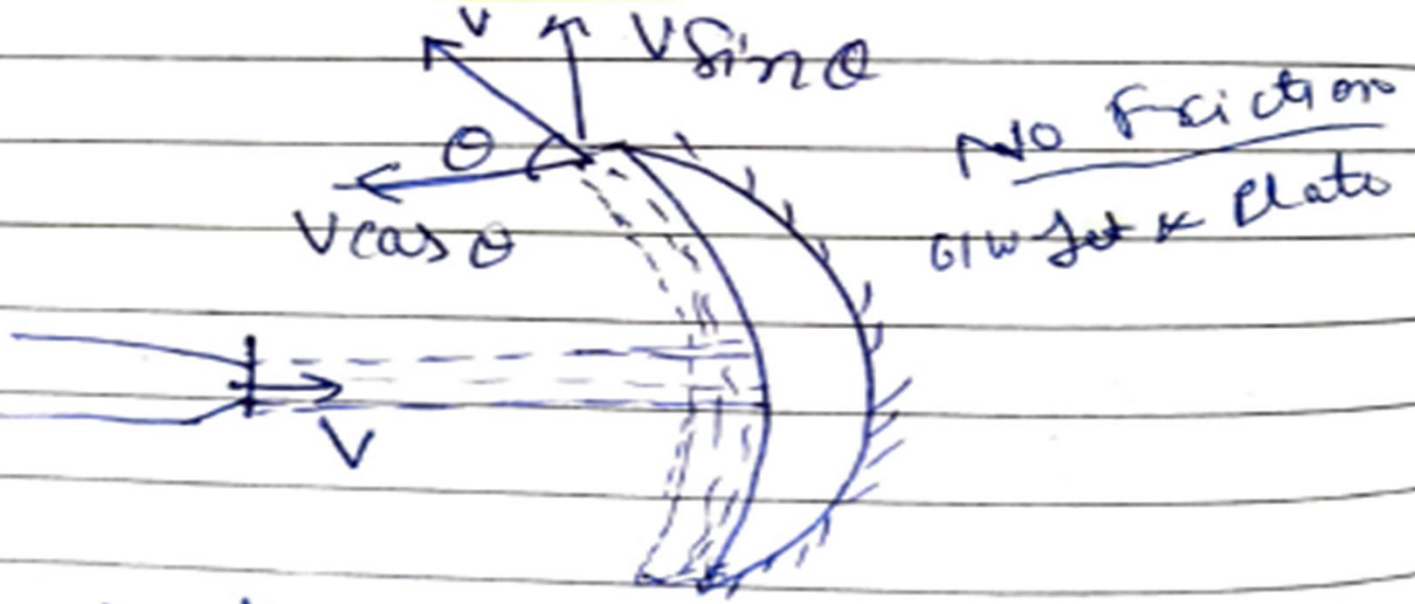
$$= \rho A V^2 \sin\theta \cdot \sin\theta$$

$$\boxed{F_x = \rho A V^2 \sin^2\theta} =$$

Force in y direction

$$\boxed{F_y = \rho A V^2 \sin\theta \cos\theta} =$$

(a) Jet Strike the curved Plate at the centre



the jet after striking the plate comes out with same velocity if plate is smooth. and there is no loss of Energy due to

impact of jet, in tangential direction of plate,

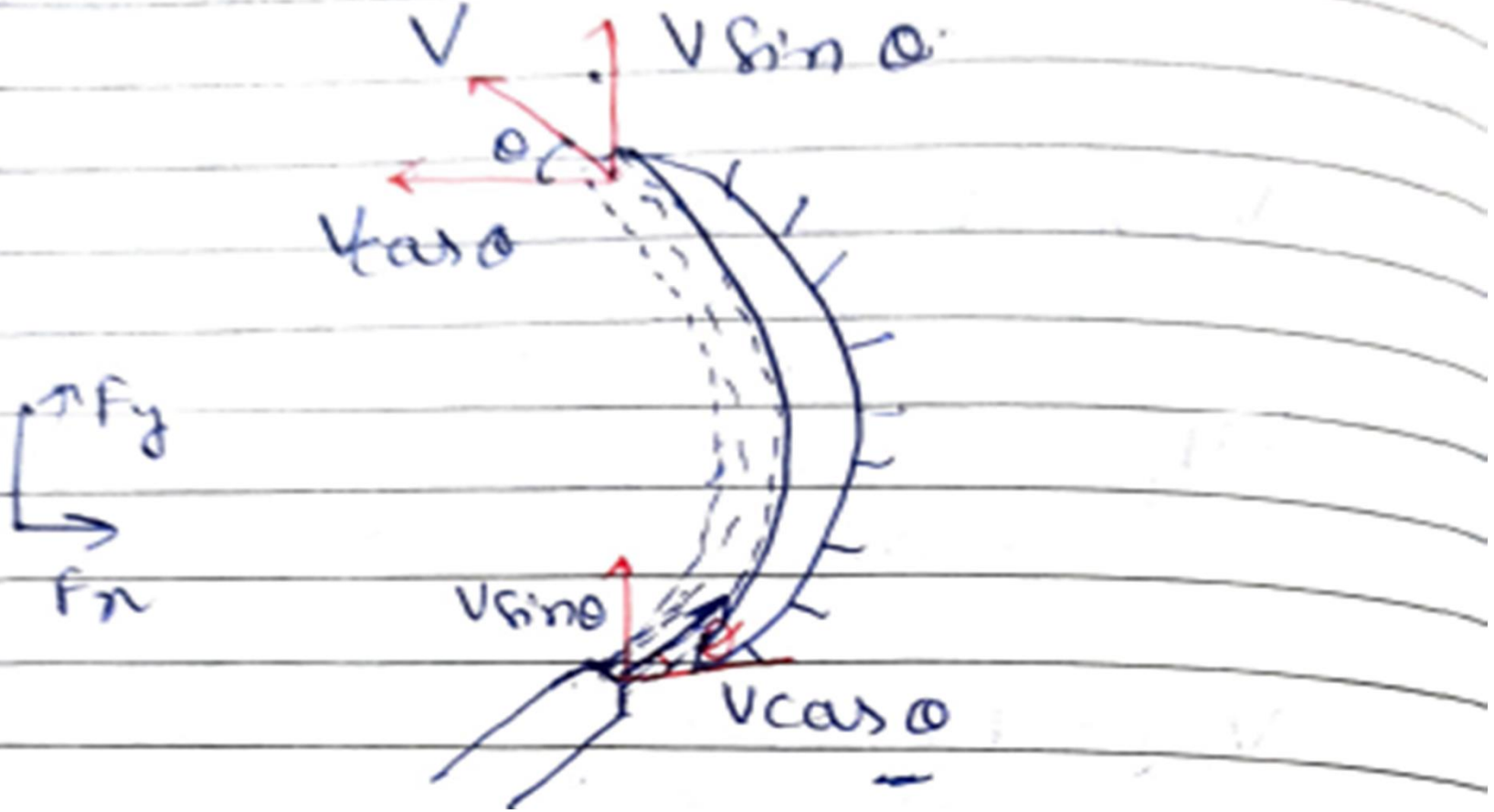
V_{1x} → Initial velocity x direction
$= V$

V_{2x} = Final velocity in x direction
$= -V \cos\theta$
opposite to direction of jet velocity

V_{y_1} = initial velocity in y direction
$= 0$

V_{2y} = Final velocity in y direc^{n}.
$= V \sin\theta$

(B) Jet strikes the curved plate at one end tangentially when the plate is symmetrical.



Let curved Plate is q Symmetrical about x axis, then angle made by the tangents at two Ends of Plate will be same.

Plate is Smooth there is no Energy loss due to impact of jet.

$V_{1x} \rightarrow V \cos\theta$

$V_{2x} = -V \cos\theta$

$V_{1y} = V \sin\theta$

$V_{2y} = V \sin\theta$

Force Exerted in x direction

$$F_x = \dot{m} (V_{1x} - V_{2x})$$

$$= \rho A V [V \cos\theta - (-V \cos\theta)]$$

$$\boxed{F_x = 2\rho A V^2 \cos\theta}$$

Force Exerted in y direction

$$F_y = \dot{m} [V_{1y} - V_{2y}]$$

$$= \rho A V [V \sin\theta - V \sin\theta]$$

$$\boxed{F_y = 0}$$