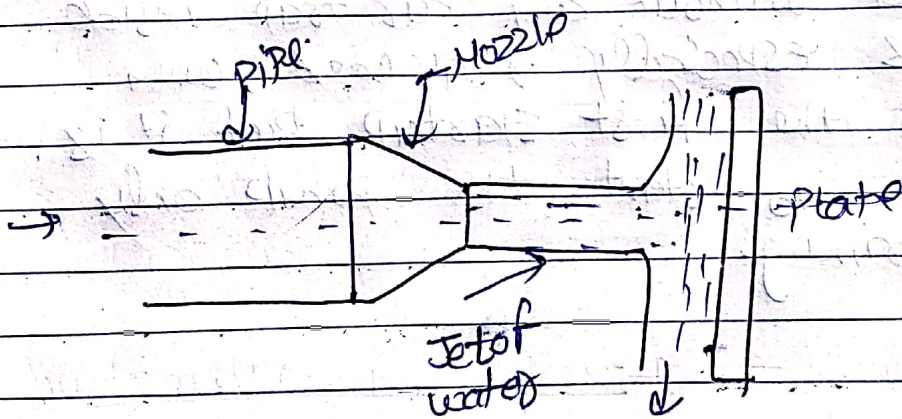


section - 5

2 Explain force exerted by a fixed plate.
 why priming is necessary in pump?

- Q $v =$ velocity of jet
- $d =$ diameter of jet
- $a =$ Area of cross-section of jet
- $\theta =$ angle between the jet and plate
- $\rho =$ density of water and
- $Q =$ discharge of water (m^3/s)

plate is normal to jet



a jet of water coming out from the nozzle strikes a flat vertical plate as shown,

$F_x =$ Rate of change of momentum in the direction of force.

$=$ mass striking the plate / sec \times change of velocity in direction of jet

$=$ mass / time \times (Initial velocity - final velocity)

$$= \frac{\rho \pi (v-u)}{6}$$

$$= \rho \pi (v-u)$$

$$= \rho \pi v u$$

$$\boxed{P_n = \rho \pi v^2}$$

why priming is necessary \Rightarrow priming is

the process in which the impeller of a centrifugal pump will get fully submerged in liquid without any air trap inside. This is especially required when there is the first startup. But it is advisable to start the pump only after priming.