HM9311989030-418

Opening Times:
9A.M – 10 P.M
(All 7 Days Open)

HIND PHOTOSTATE & BOOK CENTER

Best Quality Hand Written Notes to Crack GATE, IES,

PSU's & other Government Competitive/ Entrance Exams

CIVIL ENGINEERING

MADE EASY

Topper Handwritten Notes

HYDRAULIC MACHINE

By-Praveen Sir

F230, Lado Sarai New Delhi-110030 Phone: 9311 989 030	Shop No: 46 100 Futa M.G. Rd Near Made Easy Ghitorni, New Delhi-30 Phone: 8595 382 884	F518 Near Kali Maa Mandir Lado Sarai New Delhi-110030 Phone: 9560 163 471	Shop No.7/8 Saidulajab Market Neb Sarai More, Saket, New Delhi-30 Phone: 9654 353 111

Website: www.HindPhotostate.com

Contact Us: 9311 989 030

Courier Facility All Over India

HYDRAULIC MACHINE –

1) Impact of jets (Dynamic action of fluid)

2) Turbine
   - Pelton
   - Francis
   - Kaplan.

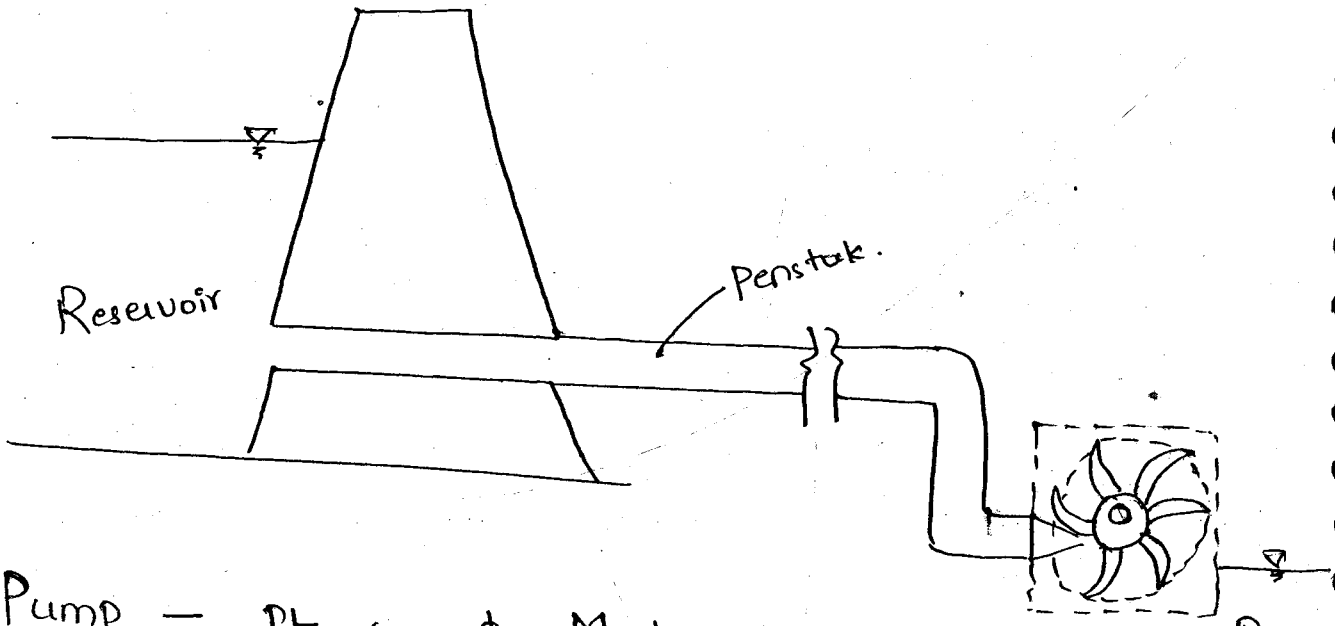
ESE obj – 6 Q obj. marks.
ESE conv. – 20–40
GATE – 2–4 marks

3) Pumps
   - centrifugal.
   - Reciprocating.

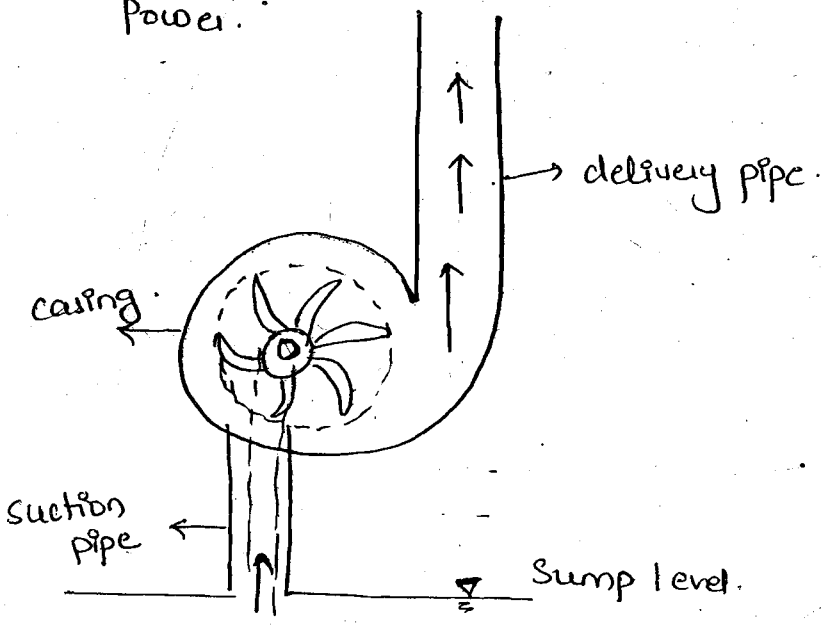
Turbine – It converts hydraulic power or water power into mechanical power.

Introduction –

* Turbine : It converts hydraulic power or water power into mechanical power.



* Pump – It converts Mechanical Power to Hydraulic Power.



Impact Of Jet – (Dynamic Action of fluid)

FORCE CONCEPT –

Impulse – suddenly applied force By applicatn of force the momentan will be change Ex- slap in check.

(1) Impulse Momentum Theorem :

Impulse = Change in momentum.

$$\boxed{F \cdot dt = mV_2 - mV_1} \quad \text{—— (1)}$$

In case of water we have to consider.

Mass of flow rate $\left(\frac{dM}{dt} = \dot{M} \right) = \rho Q \ (kg/s)$

By differentiating equation (1),

$$F = \frac{d}{dt} \left(mV_2 - mV_1 \right)$$

$$= \frac{d}{dt} mV_2 - \frac{d}{dt} mV_1$$

$$= \frac{dM}{dt} \cdot V_2 - \frac{dM}{dt} \cdot V_1$$

$$\boxed{F = \dot{M}V_2 - \dot{M}V_1}$$

force equal to rate of change of Momentum.

$$F_{(external\ /\ Vanes\ /\ Blades)} = \dot{m}V_2 - \dot{m}V_1$$

$$f_{water\ jet} = -F_{vane}$$

$$= -(\dot{m}V_2 - \dot{m}V_1)$$

$$\boxed{F_{jet} = \dot{m}V_1 - \dot{m}V_2}$$

Energy Concept -

Energy (solid body)	Energy / sec (Power)	$\frac{(\text{Power or Work done/sec})}{\dot{m}g\ (\text{Head})}$
$\frac{1}{2}mv^2$ (KE)	$\frac{1}{2}\dot{m}v^2$	$\frac{\frac{1}{2}\dot{m}v^2}{\dot{m}g} = \frac{v^2}{2g}$
mgh (PE)	$\dot{m}gh$	$\frac{\dot{m}gh}{\dot{m}g} = h$
$F \cdot x$ (WD)	$F \cdot v$ $v \rightarrow$ velocity of body jisme force lagega	$\frac{F \cdot v}{\dot{m}g}$