Experiment 5

IMPACT OF JET (II)

OBJECTIVE:

To investigate the reaction force produced by the impact of a jet of water on to various target vanes (conical and 30^o plate)

APPARATUS:

- The F1-10 Hydraulic Bench
- F1-16 equipment
- Stopwatch
- Conical and 30^o plates.

PROCEDURE:

1. Position the weight carrier on the weight platform and add weights until the top of the target are clear of the stop and the weight platform is floating in mid position. Move the pointer so that it is aligned with the weight platform. Record the value of weights on the weight carrier.
2. Start the pump and establish the water flow by steadily opening the bench regulating valve until it is fully open.
3. The vane will now be deflected by the impact of the jet. Place additional weights onto the weight carrier until the weight platform is again floating in mid position.
4. Measure the flow rate and record the result on the test sheet, together with the corresponding value of weight on the tray. Observe the form of the deflected jet and note its shape.
5. Reduce the weight on the weight carrier in steps and maintain balance of the weight platform by regulating the flow rate in about three steps, each time recording the value of the flow rate and weights on the weight carrier.
6. Close the control valve and switch off the pump. Allow the apparatus to drain.
7. Replace the 30^o vane with conical vane and repeat the test

TABLE OF OBSERVATIONS AND CALCULATIONS:

- **Nozzle diameter, d=0.008m**
- **Nozzle cross sectional area, $A=5.0265*10^{-5}m^2$**
- **Density of Water, $\rho=1000kg/m^3$**

Reading No	Plate type	Volume of water collected m^3	Time (sec)	Mass applied(Kg)
1	Conical plate $\alpha=120^o$			
2				
3				
4				
5				
1	30^o plate $\alpha=30^o$			
2				
3				
4				
5				

GRAPHICAL RELATIONSHIP:

Plot force on vane F (N) against the velocity squared values for both Conical and 30^o plates for theoretical and experimental values on the same plot.

CONCLUSION AND RECOMMENDATIONS:

- Comment on the agreement between your theoretical and experimental results and give reasons for any differences
- Comment on the significant of any experimental errors