ANURAG GROUP OF INSTITUTIONS
(Autonomous)
Department of Civil Engineering
II-B.Tech-II-Semester Assignment Questions
Subject: Hydraulics and hydraulic Machinery

1. Define the terms: model, prototype, model analysis, hydraulic similitude.
2. The pressure difference Δp in a pipe of diameter D and length L due turbulent flow depends upon the velocity V, viscosity μ, density and roughness k. using Buckingham's pi- theorem or otherwise obtain expression Δp.
3. What is meant by geometric, kinematic, and dynamic similarities? Are these similarities truly attainable? If not why?
4. Find the force exerted by a jet of water diameter100mm on a stationary flat plate when the jet strikes the plate normally with a velocity of 30 m/s.
5. A) Draw the characteristics curve of Turbine.
   b) What are the different types of Draft tube and write its function

6. Differentiate between the volute casing and vortex casing for the centrifugal pump.

7. A Centrifugal pump running at 800 rpm is working against a total head of 20m. The external diameter of the impeller is 480mm and the outlet width is 60mm. If the vane angle at outlet is 40^0 and manometric efficiency is 70%. Determine

i) Flow velocity at outlet.

ii) Absolute velocity of water leaving the vane.

iii) Angle made by the absolute velocity at out let with direction of motion.

iv) Discharge through the pump.

8. Two turbo generators each of capacity 25,000kW have been installed at a hydel power station. During a certain period the load on the hydel plant varies from 15,000kW to 40,000kW, calculate

i. The total installed capacity

ii. The load factor

iii. The plant factor and

iv. The utilization factor

9. Show that the force exerted by a jet of water on moving inclined plate in the direction of jet is given by $F_x = pa(V-u)^2 sin^2\theta$

10. A jet of water of diameter 100mm strike a curved plate at its centre with a velocity of 15m/s. the curved plate is moving with a velocity of 7 m/s in the direction of the jet. The jet is deflected through an angle of 150°. assuming the plate smooth find : i) force exerted on the plate in the direction of the jet , ii) power of the jet, iii) efficiency