Code No: RT22012   **R13**   SET - 1

II B. Tech II Semester Supplementary Examinations, November-2017
HYDRAULICS AND HYDRAULIC MACHINERY
(Civil Engineering)

Time: 3 hours   Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

~~~~~~

PART-A

1. a) What do you know about critical depth in an open channel flow.
   b) Differentiate between Geometric similarity and Kinematic similarity.
   c) Explain about Hydraulic efficiency and mechanical efficiency.
   d) Explain about various parts of pelton wheel.
   e) Explain about different characteristic curves of turbine.
   f) What is meant by pump? What are various classifications of pump?
   g) What are various components of reciprocating pump.

   (3M+4M+4M+3M+3M+3M+2M)

PART-B

2. a) Distinguish between Prismatic and Non-prismatic channels.
   b) A rectangular channel has a convex curvature in a vertical plane on its bed. At a section the bad has an inclination of 30^0 to the horizontal and the depth measured normal to the flow is 0.75 m. A certain flow produces a normal acceleration of 0.4 g which can be assumed to be constant throughout depth. Determine the pressure distribution and compare with hydrostatic distribution. Also determine the pressure distribution if the boundary has a concave curvature to the flow and rest of the data remain same?   (8M+8M)

3. a) What are similarities between model and prototype. Mention the applications of model testing.
   b) A spillway model is constructed on a scale of 1:25. Calculate (i) the prototype discharge corresponding to model discharge of 0.12 m3/sec (ii) the velocity in model corresponding to prototype velocity of 3.5 m/s.   (8M+8M)

4. a) What do you understand about the Heads and efficiencies and explain very clearly.
   b) A jet of water of diameter 100 mm strikes a curved plate at its centre with a velocity of /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) forced exerted on the plate in the direction of the jet (ii) power of the jet (iii) efficiency.   (8M+8M)

5. a) Write a brief note on classification of turbines.
   b) A pelton wheel has to be designed for the following data: power to be developed =6000 kW, Net head available = 400 m, speed = 550 rpm, Ratio of jet diameter to the wheel diameter = 1/10 and overall efficiency = 85%. Find the number of jets, diameter of jet, diameter of the wheel and quantity of water required.   (8M+8M)

6. a) Define centrifugal pump and explain the working procedure of a single-stage centrifugal pump with   neat sketch.
   b) A centrifugal pump is to discharge 0.118 m^3/s at a speed of 1450 rpm against head of 25 m. The impeller diameter is 250 mm, its width at outlet is 50 mm and manometer efficiency is 75%. Determine the vane angle at the outer periphery of the impeller.   (8M+8M)

7. a) Briefly explain the classification of power plants based on the storage characteristics.
   b) Write a clear note on estimation of Hydro power potential?   (8M+8M)