R13

SET - 1

II B. Tech II Semester Supplementary Examinations, Dec - 2015
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**
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PART-A

1. a) What do you know about hydraulic jump.
   b) Define Reynolds number and explain
   c) What are different classifications of turbines.
   d) What is overall efficiency and explain.
   e) Write about cavitation of turbine.
   f) What do you know about Net Positive Suction Head (NPSH)
   g) Explain about Multi-stage pump.

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

PART-A

2. a) Write a short note on velocity distribution in open channel flow.
   b) Define kinetic energy and momentum correction factors. The velocity distribution along a verticalin a channel can be expressed as $v/V0=(y/y0)^{1/2}$ where v is the velocity at a distance y above the bottom of the channel and V0 is the velocity at the surface of the channel of depth Y0. Find the kinetic energy correction factor and momentum correction factors.

   (8M+8M)

3. a) What is dimensional homogeneity? Explain Geometric, kinematic and Dynamic similarity.
   b) State Buckingham's π- theorem. The resting force R of a supersonic plane during flight can be considered as dependent upon the length of the aircraft l , velocity V, air viscosity μ, air density ρ and bulk modulus of air K. Express the functional relationship between these variables and the resisting force using Buckingham's π- theorem.

   (8M+8M)

4. a) What are the applications to radial flow turbines and explain in brief
   b) A jet of water of 10 cm diameter is discharging under a constant head of 80 m. Find the force exerted by the jet on a fixed plate. Take coefficient of velocity as 0.9.

   (8M+8M)

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5.　a) What is cavitation? How can it be avoided in reaction turbine?

　　b) A turbine develops 9000 kW when running at 10 rpm. The head on the turbine is 30 m. If the head on the turbine is reduced to 18 n, determine the speed and power developed by the Turbine.

(8M+8M)

6.　a) What is the difference between single-stage and multistage pumps? Describe multistage Pump with (i) impeller in parallel (ii) impeller in series.

　　b) The diameter of an impeller of a centrifugal pump at inlet and outlet are 20 cm and 40 cm respectively. Determine the minimum speed for starting the pump if it works against a head of 25 m.

(8M+8M)

7.　a)　Show that the capacity factor is equal to the product of the load factor and utilization factor.

　　b) What are the classification of Hydropower plants and explain any two in brief?

(8M+8M)

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