Seat No.	

S.E. (Civil) (Part - II) (Semester - IV) Examination, May - 2014
FLUID MECHANICS - II (Revised)
Sub. Code : 43590

Day and Date : Saturday, 24 - 05 - 2014

Time : 10.00 a.m. to 1.00 p.m.

Total Marks : 100

Instructions :
1) Attempt any three questions from each section.
2) Figures to the right indicate full marks.

SECTION - I

Q1) a) Derive resistance equations for open channel flow. What are the factors affecting rugosity coefficients. **[8]**

b) Find the dimensions of most economical rectangular & trapezoidal channel section for given data. **[8]**

   i) Discharge = 2 cumec.

   ii) Bed Slope = 1 in 900.

   iii) n = 0.015.

Q2) a) Explain direct step method of GVF computations. Describe the steps in tabular form. **[8]**

b) Determine the slope of GVF profile at a depth 3.0 m. in a wide rectangular channel carrying discharge of 2 cumec/m width. Bed slope is 1 in 1600. Take n = 0.03. Find the Froude No. Classify the profile. **[8]**

P.T.O.

Q3) a) Define rapidly varied flow. Compare it with GVF. Draw sketch of Hydraulic jump. Find the sequent depth for an initial depth 0.5 m of hydraulic jump occured in a stilling basin of base width 5 m carrying discharge of 15 cumec on horizontal floor. Find Frondes No. before the jump & after the jump. **[8]**

b) Sketch the WES profile of ogee Spillway. Find the discharge passing over ogee Spillway of total length 25 m. Spillway has 4 peirs of 1 m width. The head over the crest is 2.5 m. Use Francis formula. Derive the coefficient of weir. **[8]**

Q4) Write short notes on (Any Three): **[18]**

a) Types of channels & channel flow.

b) Specific energy curve, Specific force curve, their significance.

c) GVF profiles & practical examples.

d) Hydraulic jump as energy dissipater.

e) Calibration of notch.

SECTION - II

Q5) a) Show that in case of a curved moving vane, jet strikes at the centre, the maximum Efficiency is just 60%. **[8]**

A jet of water 5 m in diameter having velocity 25 m/s strikes normally a smooth flat plate. Determine the thrust if the plate is moving with 5 m/s.

b) Draw & explain the working of Kaplan turbine. Describe the function of each component part. **[8]**

Q6) a) State & define following in case of turbines. **[8]**

i) Unit quantities.

ii) Specific speed.

What is the significance of these terms.

b) What are different types of pumps? Draw & explain working of Centrifugal pump. What are the merits & demerits of Centrifugal pump. **[8]**

Q7) a) Draw typical performance characteristic curves of centrifugal pump. **[8]**

      i) Main & operating characteristic.

      ii) Iso-efficiency curves.

      What is its significance?

    b) What do you understand by the term Drag & lift. With examples differentiate between pressure drag & friction drag.

      Find drag on a solid sphere 500 mm in diameter, held completely immersed in the flow of sea water. Velocity of flow is 1.15 m/s & specific gravity of sea water is 1.025. Assume drag coefficient 0.6. **[8]**

Q8) Write short notes on (Any Three): **[18]**

    a) Inlet & outlet velocity triangle of jet moving on curved vane.

    b) Selection of type of turbine.

    c) Cavitation in pumps.

    d) Boundary layer along thin plate.

    e) Separation of boundary layer & control.

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