SL-242

Total No. of Pages :3

Seat No.	

S.E. (Civil) (Part - II) (Semester - IV) (Revised) Examination, May- 2017
FLUID MECHANICS - II
Sub. Code: 63347

Day and Date :Wednesday, 03- 05 - 2017 **Total Marks : 100**
Time :10.00 a.m. to 1.00 p.m.

Instructions :
1) **Que. No.1 & Que. No. 5 are compulsory.**
2) **Out of remaining attempt any two questions from each section.**
3) **Figures to the right indicate full marks.**
4) **Assume suitable data if necessary & state it clearly.**

SECTION-I

Q1) Attempt any four of the following:

a) What do you understand by open channel flow? How does it differ from the pipe flow? **[5]**

b) Show that Chezy's coefficient $C = R^{1/6}/n$), where "R" is the hydraulic radius and "n" is manning's roughness coefficient? **[5]**

c) Define: **[5]**

i) Critical depth

ii) Alternate depths

d) A triangular channel has side slopes of 2 horizontal to 1 vertical. It is laid at a slope of 1 in 2500. If depth of water in the channel is 1m. Calculate the discharge. Take Manning's n = 0.02. **[5]**

e) Explain- What is a hydraulic jump? How are they classified? **[5]**

P.T.O.

Q2) a) A trapezoidal channel is 5m wide at bottom and how a side slope of 0.5H:1V. The bed slope of the channel is 0.0003. Find the discharge of the most Economical section. Assuming Manning's coefficient 0.02. **[5]**

b) Show that relation between the alternate depths Y_1 and Y_2 in a rectangular channel can be expressed by **[5]**

$$\frac{2y_1^2y_2^2}{(y_1+y_2)} = y_c^3$$

c) Prove that for a trapezoidal channel of most economical section hydraulic radius = 0.5 the depth of flow. **[5]**

Q3) a) A rectangular channel 20m wide closed with normal depth of 2m with a bed slope of 1/6400. At a certain section the depth of flow is 3m how far upstream or downstream of this section will the depth be 2.6m. Use step method and one step. Take n=0.015 sketch and classify the profile. **[8]**

b) List the gradually varied flow profile which are possible. Sketch M_1, M_2 and M_3 profiles. **[7]**

Q4) a) Starting from the first principle derived an expression for loss of energy due to hydraulic jump in a rectangular channel in the form. **[8]**

$$\Delta E = \frac{(y_2-y_1)^3}{4y_1y_2}$$

b) In a rectangular channel a discharge of $2m^3/s/m$ flows with a Froude number 6. If the hydraulic jump takes place. Calculate the energy lost per meter width of channel due to jump. **[7]**

SECTION-II

Q5) a) What is a notch? How are the notches classified? **[5]**

b) Derive a formula for discharge over rectangular notch. **[5]**

c) A jet of water 75 mm diameter having a velocity of 20 m/s, strikes normally a flat smooth plate. Determine the thrust on the plate **[5]**

i) If the plate is at rest

ii) If the plate is moving in same direction as the jet with velocity of 5m/s. Also find the work done per second on the plate in each case and efficiency of the jet when the plate is moving.

d) How will you classify the turbines? **[5]**

Q6) a) A right angled triangular notch is provided in vertical side of tank having plan area of $0.93m^2$ uniform at all levels. When the head over the notch is 75mm, it is found that the water surface in the tank is falling down at a rate of 2.54mm per second calculate the coefficient of discharge of notch. **[8]**

b) What is a weir? How are the weirs classified? What is difference between a sharp crested and broad crested weir. **[7]**

Q7) a) Derive an expression for the force exerted by the jet of water on stationary flat plate held normal to the jet. **[5]**

b) Draw schematic diagram of Francis turbine. Explain briefly its construction and working. **[10]**

Q8) Write a note on: **[15]**

a) Types of Draft tubes.

b) Classification of centrifugal pumps.

c) Priming of centrifugal pump.

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