FirstRanker.com

www.FirstRanker.com

Enrolment. FirstRanker.com

GUJARAT TECHNOLOGICAL UNIVERSITY BE - SEMESTER- VI (New) EXAMINATION – WINTER 2019

Subject Code: 2160602

Subject Name: Applied Fluid Mechanics

Time: 02:30 PM TO 05:00 PM

Total Marks: 70

04

Date: 06/12/2019

Instructions:

- 1. Attempt all questions.
- 2. Make suitable assumptions wherever necessary.
- 3. Figures to the right indicate full marks.
- Q.1 (a) Define: (i) Critical depth (ii) Total energy line (iii) Hydraulic 03 gradient line
 - (b) Describe water hammer phenomenon in pipes. 04
 - (c) Derive the Hagen-Poiseuille equation for laminar flow in the 07 circular pipe.
- Q.2 (a) Define the most economical channel section. Derive the 03 condition for rectangular channel of best section
 - (b) Differentiate hydro-dynamically smooth and rough pipes.
 - (c) A horizontal pipe of diameter 450 mm is suddenly contracted 07 to diameter of 250 mm. The pressure intensity in larger and smaller pipes are given as 14.5 N/cm² and 12.5 N/cm². If Cc= 0.62 find loss of head due to sudden contraction and discharge of water

OR

- (c) Prove that Maximum Velocity is equal to one and half times 07 the average velocity for flow between fixed parallel plate.
- Q.3 (a) Define and enlist types of draft tube with neat sketch 03
 - (b) What do you mean by pipes in series and pipes in parallel? How 04 the loss of head is determined in both systems.
 - (c) Explain boundary layer growth over a flat plate.Derive the 07 expression for momentum thickness of boundary layer flow.

OR

- Q.3 (a) Write a note on prandtl mixing length theory 03
 (b) Write a note on prevention of boundary layer separation 04
 (c) Explain boundary layer theory and derive Karman's 07 momentum equation for boundary layer.
 Q.4 (a) Differentiate between back water curve and drop down curve. 03
 - (b) Derive Chezy's formula to calculate the velocity in case of a 04 channel.
 - (c) A 6 meter wide channel conveys water at a depth of 2.15 m. 07 The bedslope of channel is 0.001. Find the width to be provided in transition so as to obtain critical depth. Alternatively with the same width of 6m, find the rise in the bedlevel required to produce critical flow in channel. Take N= 0.018

OR

- Q.4 (a) Define specific speed, unit discharge and unit power of turbine. 03
 - (b) Draw Specific energy curve and explain the terms, Critical 04 depth, alternate depths, sub critical and super critical flow
 - (c) Describe direct step method of calculating the length of back 07 water curve, also discuss the need for calculating the length of back water curve.



- (b) What are distorted and undistorted models? What are the 04 advantages of using distorted model?
- What is dimensional less number? State and explain them. 07 (c)

OR

03

- Q.5 (a) Differentiate between Impulse and Reaction turbine.
 - Two jet strikes the bucket of Pelton wheel which is having shaft 04 **(b)** power of 16000 kW, the diameter of each jet is given as 200 mm. If the net head on the turbine is 200 m. Find the overall efficiency of a turbine. Take Cv=1
 - State and explain Buckingham's π theorem. Why it is 07 (c) considered over Rayleigh method over dimensional analysis.

www.FirstRanker.com