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B.Tech. CIVIL ENGINEERING (BTCLEVI)

Term-End Examination

December, 2017

BICE-025 : HYDRAULICS AND HYDRAULIC MACHINES

Time : 3 hours

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Maximum Marks : 70

Note: Answer any seven questions. All questions carry equal marks. Use of scientific calculator is permitted. Assume missing data, if any.

- 1. (a) Differentiate between open channel flow and pipe flow.
 - (b) Describe the various types of open channels.
- 2. Describe the specific energy curve with the help of an appropriate diagram. Find the critical depth and critical velocity of water flowing through a rectangular channel of width 5 m, when discharge is 15 m³/s. 5+5

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5

5

Deri	ve the conditions needed for the most	
econ	omical rectangular channel.	10
Find of w 3 ver the v of th	the discharge through a trapezoidal channel idth 8 m and side slope of 1 horizontal to rtical. The depth of flow of water is $2 \cdot 4$ m and value of Chezy's constant, C = 50. The slope e bed of channel is 1 in 4000.	10
State of g limit	e the assumptions required for the equation gradually varied flow. Also state the cations of this equation.	6+4
Deriv in te	ve the expression for depth of hydraulic jump rms of upstream Froude number.	10
Diffe rotoc sketc	erentiate between rotodynamic pumps and lynamic machines. Also provide neat ches, wherever needed.	10
(a)	Differentiate between Francis and Pelton turbines.	5
(b)	Explain different types of efficiency of a turbine.	5
Desc	ribe the following : $4 \times 2\frac{1}{2}$	=10
(a)	Cavitation 2	
(b)	Surge	
(c)	Draft Tube	
(d)	Spear Valve	
E-025	2 1,0	000
	Deri econ Find of w 3 ver the of th State of (limit Deri in te Diffe rotoo sketa (a) (b) Desc (a) (b) (c) (d) E-025	Derive the conditions needed for the most economical rectangular channel. Find the discharge through a trapezoidal channel of width 8 m and side slope of 1 horizontal to 3 vertical. The depth of flow of water is 2.4 m and the value of Chezy's constant, C = 50. The slope of the bed of channel is 1 in 4000. State the assumptions required for the equation of gradually varied flow. Also state the limitations of this equation. Derive the expression for depth of hydraulic jump in terms of upstream Froude number. Differentiate between rotodynamic pumps and rotodynamic machines. Also provide neat sketches, wherever needed. (a) Differentiate between Francis and Pelton turbines. (b) Explain different types of efficiency of a turbine. Describe the following : $4\times 2\frac{1}{2}$: (a) Cavitation (b) Surge (c) Draft Tube (d) Spear Valve

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