

R18

Code No: 154BA

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech II Year II Semester Examinations, November/December - 2020

HYDRAULICS AND HYDRAULIC MACHINERY

(Civil Engineering)

Time: 2 Hours

Max. Marks: 75

Answer any Five Questions
All Questions Carry Equal Marks

1. Prove that for trapezoidal channel of most economical section Half of top width is equal to length of one of the sloping side. [15]

2. Find the critical depth and critical velocity of water flowing through a rectangular channel of width 5 m, when discharge is $15 \text{ m}^3/\text{s}$. [15]

3. Find the rate of change of depth of water in rectangular channel of 10m wide and 1.5 m deep, when the water is flowing with a velocity of 1 m/s. The flow of water through the channel bed slope 1 in 4000, is a regulated in such a way that energy line is having a slope of 0.00004. [15]

4. Write the applications and types of hydraulic jumps. [15]

5. What do you mean by repeating variables? How are repeating variables selected for dimensional analysis? [15]

6.a) Obtain an expression for the force exerted by a jet of water on fixed vertical plate in the direction of the jet.

b) Show that the efficiency of a free jet striking normally as series of flat plates mounted on the periphery of a wheel never exceed 50%. [8+7]

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

b) A power develops 9000 kW when running at 10 r.p.m. The head on the turbine is 30 m. If the head of the turbine is reduced to 10m, determine the speed and the power developed by the turbine. [8+7]

8.a) Draw and discuss the operating characteristics of a centrifugal pump.

b) Briefly state the significance of similarity parameters in hydraulic pumps. [8+7]

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