

Code No: 154BA

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech II Year II Semester (Special) Examinations, January/February - 2021
HYDRAULICS AND HYDRAULIC MACHINERY
(Civil Engineering)

Time: 2 Hours

Max. Marks: 75

Answer any Five Questions
All Questions Carry Equal Marks

1. A rectangular channel of width, 4m is having a bed slope of 1 in 1500. Find the maximum discharge through the channel. Take value of $C = 50$. [15]
2. Prove that for a channel of circular section, the depth of flow, $d = 0.81 D$ for maximum velocity and $d = 0.95 D$ for maximum discharge, Where D is diameter of circular channel and d is depth of flow. [15]
3. Discuss the positive and negative surges in a rapidly varied flow. [15]
- 4.a) Write the characteristics of hydraulic jump in rectangular channel.
b) The specific energy for a 6 m wide rectangular channel is to be 5 kg-m/kg. If the rate of flow of water through the channel is $24 \text{ m}^3/\text{s}$, determine the alternate depths of flow. [8+7]
5. By π -theorem and using variable such as power P , speed N , head H , diameter D of the turbine, density ρ of the fluid and acceleration due to gravity g , deduce the above expression for specific speed N_s . [15]
- 6.a) Differentiate between the force exerted by the jet of water on a fixed vertical plate and moving plate.
b) The water in a jet propelled boat is drawn amid-ship and discharged at the back with an absolute velocity of 20 m/s. the cross sectional area of the jet at back is 0.02 m^2 and the boat is moving in the sea water with a speed of 30km/hour. Determine:
i) Propelling force on the boat.
ii) Power required to drive the pump.
iii) Efficiency of jet propulsion. [8+7]
7. What are unit quantities? Define the unit quantities for a turbine. Why they are important. [15]
8. Write and explain the classification of hydro power plants. [15]

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