

Full
marks
20

Class Test on CE 3121
Department of Civil Engineering
Rajshahi University of Engineering & Technology

Time
20 min

1. Write down the different criteria for critical state of flow. Show that at the critical state of flow the velocity head is equal to half of the hydraulic depth. (5)
2. What is specific energy diagram? Discuss critical flow with energy diagram. (5)
3. Prove that at the critical state of flow, specific flow is minimum for a given discharge. (5)
4. Derive a relationship between the initial depth and sequent depth of a hydraulic jump on a horizontal floor in a rectangular channel. (5)

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Q.01

A metal plate of 10 mm thickness and 200 mm square is hung so that it can swing freely about the upper horizontal edge. A horizontal jet of water of 20 mm diameter impinges with its axis perpendicular and 50 mm below the edge of the hinge, and keeps it steadily inclined at 30° to the vertical. Find the velocity of jet if the specific weight of the metal is 75.54 KN/m^3

Q.02

A single acting reciprocating pump has a plunger of diameter 25 cm and stroke of 35 cm. If the speed of the pump is 1 r.p.s. and delivers 16.5 L/sec of water against a suction head of 5 m and a delivery head of 20 m, find the Q_{th} , C_d , S , % of S and the power required to drive the pump in HP, where symbols carry the usual meaning.

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- Q.01 Write short notes on i) Backwater curve and ii) Drawdown curve. 04
- Q.02 Sketch the possible flow profile for the following and mention the type of flow- 06
- i) Flow from reservoir into mild slope channel.
 - ii) Flow from reservoir into steep slope channel.
- Q.03 Water is flowing under the sluice gate in a horizontal rectangular channel that is 10 ft wide. The depth y_0 and y_1 are 65 ft and 1 ft respectively. What will be the horse power lost in the hydraulic jump? Assume energy loss is negligible.