DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

End Semester Examination – May 2019

Course: B. Tech in -Civil Engineering **Sem: IV**

Subject Name: Hydraulic II **Subject Code: BTCVC401**

Max Marks: 60 **Date:- 14/05/19** **Duration:- 3 Hr.**

Instructions to the Students:
1. Each question carries 12 marks.
2. Attempt **any five** questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly

Marks

Q. 1 Attempt following Questions

(A) Enlist flow measuring devices and explain pitot tube. 4

(B) Differentiate Between open channel and pipe flow.

(C) Determine the height of rectangular weir of length 6m to be built across a rectangular channel. The maximum depth of water on the upstream side of the weir is 1.8 m and discharge is 2000 liters/s. Take C_d =0.6 and neglect end contraction. 4

4

Q.2 Attempt following Questions

(A) Define Critical depth, critical velocity, and alternate depth. 3

(B) Explain Specific energy and Specific energy curve. 4

(C) A trapezoidal channel has side slopes of 1 horizontal to 2 vertical and the slope of the bed is 1 in 1500. The area of the section is 40 m^2. Find the dimensions of the section if it is most economical. Determine the discharge of the most economical section if C=50 5

Q. 3 Attempt following Questions

(A) Define and explain 6

i) Hydraulic jump in short ii) GVF with assumptions

(B) Give classification of channels according to flow (only table) and derive expression for the length of back water curve / Direct step method.

Q.4   Attempt any two of following Questions

(A)   Derive the expression for force exerted by stationary curved plate when   6

i)jet strikes at centre ii)jet strikes at one end tangentially on symmetrical plate

(B)   Explain velocity triangles at outlet and inlet of unsymmetrical moving curved   6

plate when jet strikes tangentially at one of the tips. Derive the expression for

     1) The force exerted by jet of water on same plate

     2) Work done per second per unit weight of fluid striking per second

     3) Work done per second per unit mass of fluid striking per second.

(C)   A jet of water of diameter 7.5 cm strikes a curved plate at its centre with a   6

velocity of 20 m/s. The curved plate is moving with a velocity of 8 m/s in the

direction of jet. The jet is deflected through an angle of 165^0. Find:

i) The force on the plate i) Power of the jet iii)The efficiency of the jet.

Q.5   Attempt any two of following Questions

(A)   Write a note on classification of hydraulic turbines   6

(B)   A pelton wheel has a mean bucket speed of 10 m/s with a jet of water flowing   6

at the rate of 700 lit/sec under a head of 30m. The bucket deflects the jet through

an angle of 160^0, Calculate the power given by water to the runner and the

hydraulic efficiency of the turbine. Assume coefficient of velocity as 0.98.

(C)   Explain: 1) Classification of pumps   2) Selection of pumps.   6

Q.6   Attempt following Questions

(A)   Explain – Laminar boundary layer, Turbulent boundary layer, Laminar sub   6

layer and Separation of boundary layer.

(B)   Find The Displacement thickness, Momentum Thickness and energy thickness   6

for the velocity distribution in boundary layer given by $u/U=y/\delta$ where u is the

velocity at a distance y from the plate and $u = U$ at $y = \delta$ where δ = boundary

layer thickness. Also calculate the ratio Displacement thickness to Momentum

Thickness.

*** **End of paper** ***

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