DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular End Semester Examination – Summer 2022

Course: B. Tech. (S.Y.) | Branch : CIVIL | Semester :IV

Subject Code & Name: BTCVC405 HYDRAULICS II

Max Marks: 60 | Date: 27/08/2022 | Duration: 3.45 Hr.

Instructions to the Students:
1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

		(CO)	Marks

Q. 1 Solve Any Two of the following.

A) Define open channel flow and differentiate pipe flow from channel flow — (1) — 6

B) Derive an expression for discharge through triangular notch — (1) — 6

C) Find the time required to lower down water level from 3 m to 2 m in a reservoir of 80 m x80 m by — (1) — 6
  i) a rectangular notch of length 1.5 m .
  ii) a right angled V notch.
  Take Cd = 0.62 & other data same for both.

Q.2 Solve Any Two of the following.

A) Derive an expression for most efficient trapezoidal section of a channel. — (1) — 6

B) Explain with neat diagram ;-- specific energy curve. — (1) — 6

C) The discharge of water through a rectangular channel of width 8 m , discharge 15 m3/s when depth of flow of water is 1.2 m. Calculate :- — (1) — 6
  i) specific energy.   ii) critical depth.
  iii) minimum specific energy

Q. 3 Solve Any Two of the following.

A) Derive the dynamic equation gradually varied flow. — (2) — 6

B) A sluice gate discharges water into a horizontal rectangular channel with a discharge 19.20 m3/s ,width of channel 8 m and depth of flow 0.40 m. Determine whether a jump will occur, if so find its height & loss of energy Per kg of water. — (2) — 6

C) A jet of diameter 7.5 cm strikes a curved plate at its centre with a velocity 20 m/s. The curved plate is also moving with a velocity of 8 m/s in the direction of jet. The jet is deflected through an angle of 165 0 assuming the plate smooth find:- — (3) — 6
  i) force exerted by jet   ii) work done by the jet.

Q.4 Solve Any Two of the following.

A) Classify different types of turbines. Also differentiate impulse and reaction turbine. — (3) — 6

B) Describe draft tube stating its need and performance ,also state different shapes of it. — (3) — 6

C) A pelton wheel turbine has mean bucket speed of 10 m/s with a jet of water flowing at a rate of 700 lit/s under a head of 30 m. The bucket deflects the jet through an angle of 160⁰ Calculate horse power and hydraulic efficiency of turbine , assuming co-efficient of velocity 0.98. (3)

Q. 5 Solve Any Two of the following.

A) How pumps are generally classified, Explain in detail working of a centrifugal pump. (3)

B) Write a detailed note on :----
 i) Efficiencies of pump. ii) Multistage pump arrangements. (3)

C) A centrifugal pump delivers water against a net head of 14.5 m and at a speed of 1000 r.p.m. The vanes are curved at an angle of 30⁰ with the periphery. The impeller diameter is 300 m m and the outlet width 50 mm. Determine the discharge of pump if manometric efficiency is 95%. (3)

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