

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
<b>Q. 1 Solve Any Two of the following.</b>		
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 i) a rectangular notch of length 1.5 m . ii) a right angled V notch. Take Cd = 0.62 & other data same for both.	(1)	6
<b>Q.2 Solve Any Two of the following.</b>		
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 m <sup>3</sup> /s when depth of flow of water is 1.2 m. Calculate :- i) specific energy. ii) critical depth . iii) minimum specific energy	(1)	6
<b>Q. 3 Solve Any Two of the following.</b>		
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 m <sup>3</sup> /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:-- i) force exerted by jet ii) work done by the jet.	(3)	6
<b>Q.4 Solve Any Two of the following.</b>		
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  $160^\circ$ . Calculate horse power and hydraulic efficiency of turbine, assuming co-efficient of velocity 0.98. (3) 6

**Q. 5 Solve Any Two of the following.**

- A) How pumps are generally classified, Explain in detail working of a centrifugal pump. (3) 6
- B) Write a detailed note on :---- (3) 6
- i) Efficiencies of pump. ii) Multistage pump arrangements.
- 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  $30^\circ$  with the periphery. The impeller diameter is 300 mm and the outlet width 50 mm. Determine the discharge of pump if manometric efficiency is 95%. (3) 6

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