BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION)

CLASS: B.TECH. **SEMESTER: VII**
BRANCH: CIVIL **SESSION: MO/2022**

SUBJECT: CE416 OPEN CHANNEL FLOW

TIME: 2 HOURS **FULL MARKS: 25**

INSTRUCTIONS:
1. The total marks of the questions are 25.
2. Candidates attempt for all 25 marks.
3. Before attempting the question paper, be sure that you have got the correct question paper.
4. The missing data, if any, may be assumed suitably.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

Q1 (a) Differentiate between: (i) A canal and a flume (ii) A chute and a drop [2]

Q1 (b) The velocity distribution in a wide river 4 m deep is found to be $u = [0.3+(y/h)^{1/2}]$, in which h is the flow depth and u is the velocity at any distance y from the bottom of the river. Find the kinetic energy correction and the momentum correction factors [3]

Q2 (a) Draw neat sketches for (i) specific energy- flow depth, and (ii) discharge-flow depth curves. [2]

Q2 (b) Calculate the possible depths of flow at which a discharge of 26.67 cumec may be carried in a rectangular channel 3.5 m wide with a specific energy equal to 2.74 m. (m & s 772) [3]

Q3 (a) A steep channel with 60^o slope and 5m flow-depth has pressure intensity at bottom as……while total hydrostatic force at that section is…… [2]

Q3 (b) A most efficient trapezoidal section is required to give a maximum discharge of 21.5 m^3/s of water. The slope of the channel bottom is 1 in 2500. Taking C = 70 $m^{1/2}/s$, determine the dimensions of the channel. Also determine the value of Manning's N. (m& s 744) [3]

Q4 (a) At a critical flow, (i) specific energy is ……for a given…….. ; and (ii) velocity head is……of the flow depth. [2]

Q4 (b) Determine the critical depth, minimum specific force and minimum specific energy in a 5m wide rectangular channel with 12.5 cumecs discharge. [3]

Q5 (a) ……is a suitable method for the discharge measurement in a narrow channel while …….is suitable for the discharge measurement in a wider……..channel. [2]

Q5 (b) Describe briefly the method for discharge measurement in a big river. [3]

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