COURSE CODE (CREDITS):18B1WCE639   MAX. MARKS: 25

COURSE NAME: Open Channel Flow and Hydraulic Machine

COURSE INSTRUCTORS: Ashish Kumar   MAX. TIME: 1 Hour 30 Min

Note: *(a) All questions are compulsory.*

(b) The candidate is allowed to make Suitable numeric assumptions wherever required

for solving problems

Q. No	Question	CO	Marks
Q1	We want to design the rectangular channel which have minimum cost of construction. What parameters should we consider for this?	CO2	2
Q2	A conical draft tube having diameter at the inlet as 2.0 m and pressure head of water equal to 3.3 m (absolute). The discharge at the outlet is 30 cumec with a velocity of 1.2 m/sec. If the atmospheric pressure head is 10.3 m and losses between the inlet and outlet of the draft tube is 0.1 m; find the length of the draft tube immersed in the water. Total length of the tube is 6.5 m.	CO4	5
Q3 (a)	Design a low-cost field experiment using the float method to estimate discharge in a small stream. What considerations would you take into account to ensure accuracy and repeatability?	CO3	3
Q3 (b)	The following measurement was taken with a current meter and eco depth recorder at a particular section of a river to measure the stream flow. Compute the discharge of the river.	CO3	5
Q4	An inward flow reaction turbine running at 500 rpm has external diameter of 70 cm and a width of 18 cm. If the guide blade angle is 20° and the absolute velocity of water at inlet is 25 m/sec, find (a) The discharge of the turbine (b) The runner vane angle at inlet	CO4	4
Q5 (a)	Explain how the stage-discharge rating curve is developed. Why is it important to use simultaneous measurements of stage and discharge during its construction?	CO3	2
Q5 (b)	A broad-crested weir of 4 m length, has 50 cm height of water above its crest. (a) Find the maximum discharge. Take Cd = 0.65. Neglect velocity of approach. (b) If the velocity of approach is to be taken into consideration, find the maximum discharge when the channel has a cross-sectional area of 50 m² on the upstream side.	CO3	4

Table for Q3 (b):

Distance from left edge (m)	0	2	4	6	8	10	12
Depth of water (m)	0	1.0	2.5	3.8	2.2	1.2	0
Average Velocity (m/s)	0	0.5	1.25	2.04	1.56	0.43	0