BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION SP2023)

CLASS: BTECH **SEMESTER : VI**
BRANCH: CIVIL **SESSION : SP2023**

SUBJECT: CE416 OPEN CHANNEL FLOW

TIME: 02 Hours **FULL MARKS: 25**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates**

			CO	BL
Q.1(a)	Estimate the hydraulic depth and section factor of a right-angled triangular channel with 4 m flow depth.	[2]	2	K3
Q.1(b)	Describe a method, with a clear diagram, to measure discharge in a large river.	[3]	1	K2
Q.2(a)	With a neat sketch, draw hydraulic grade line and total energy line in a pipe flow and in a channel flow.	[2]	1	K2
Q.2(b)	The velocity distribution of a wide rectangular channel with 4 m flow depth is approximated as $u= 0.6\ y^{1/2}/h$, where h is the total flow depth and y is the variable flow depth from the channel bottom. Find α and ß.	[3]	1	K3
Q.3(a)	Define Shear Velocity. What is its dimension?	[2]	1	K1
Q.3(b)	Find the critical depth in a trapezoidal channel 20 m wide at the bottom with side slopes 1.5(H):1(V) for a discharge of 50 m^3/s.	[3]	2	K4
Q.4(a)	Hydraulic radii in the most efficient trapezoidal and circular channels are…….and……. respectively.	[2]	2	K3
Q.4(b)	A flow of 30 m^3/s is carried in a 5m wide rectangular channel at a depth of 1.0m. Find the slope necessary to sustain uniform flow at this depth if n=0.012. What change in roughness would produce uniform critical flow at this discharge on the given slope?	[3]	2	K5
Q.5(a)	What is a critical hump? What is its height?	[2]	2	K3
Q.5(b)	What is the maximum discharge that may be carried by a 2.5 m wide rectangular channel at a specific energy of 2.0 m?	[3]	1	K4

::::::22/02/2023::::::M