G.R. No.	

PAPER CODE	V223 - 222 (ESE)

May 2023 (ENDSEM) EXAM

S.Y. Civil (AY 2022-23 SEMESTER - II)
COURSE NAME: Hydraulic Engineering
COURSE CODE: CVUA 22202
(PATTERN 2020)

Time: [1Hr]   [Max. Marks: 30]

(*) Instructions to candidates:
1) Use of scientific calculator is allowed
2) Use suitable data where ever required
3) All questions are compulsory

Question No.	Question Description	Max. Marks	CO mapped	BT Level
Q.1	a) Draw sketches of M1, S2, C2 and A2 profiles	[4]	[4]	[R]
	b) A rectangular channel 20 m wide flows with normal depth of 2 m with a bed slope of 1/6400. At a certain section the depth of flow is 3m, how far upstream or downstream of this section will the depth be 2.6 m. Use step method and take only one step. n = 0.015	[6]	[4]	[A]
	OR			
	c) A wide rectangular channel carries a discharge of 5 m³/sec/m. The bed slope of the channel is 1/3600 and Manning's n = 0.02. If the channel ends in a drop , determine how far upstream the depth of flow would be within 10% of the normal depth ? Use step method and take only one step.	[6]	[4]	[A]
Q.2	a) Derive equation for force acting on an unsymmetrical stationary curved vane with jet striking tangentially at one of its tips.	[4]	[5]	[U]
	b) Derive the equation for minimum starting speed of the centrifugal pump. A centrifugal pump delivers water against a head of 18 m.	[6]	[5]	[A]

	The external and internal diameter of the impeller are 450 mm and 250 mm respectively. Find the minimum starting speed of pump.			
	OR			
	c) The following are the results of tests conducted on a centrifugal pump. Negative pressure head in suction pipe close to pump = 260mm mercury Pressure intensity in delivery pipe close to pump = 0.16 N/mm^2 Difference of level between the two gauges = 0.53m Shaft power of the electric power = 22kW Rate of discharge = 0.095 m^3/s Diameter of suction pipe = 200mm Diameter of delivery pipe = 150mm Calculate overall efficiency of the pump.	**[6]**	[5]	[A]
Q.3	a) Discuss various efficiencies in relation to turbines	**[4]**	[6]	[R]
	b) Sketch a layout of a typical hydroelectric plant and explain in brief function of each element.	**[6]**	[6]	[U]
	OR			
	c) What is hydraulic turbine? Classify the turbines according to 1) action of water 2) Direction of flow of water 3) head of turbine 4) specific speed of the turbine	**[6]**	[6]	[U]