Reg. No.												

Question Paper Code	12445

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2023

Fourth Semester

Civil Engineering

20CEPC401 - APPLIED HYUDRAULIC ENGINEERING

(Regulations 2020)

Duration: 3 Hours Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

		Marks, K-Level, CO
1.	What you understand by "Flow in open channel"?	*2,K1,CO1*
2.	Define the term hydraulic mean depth.	*2,K1,CO1*
3.	What are the empirical formulae for determining the value of Chezy's constant.	*2,K1,CO2*
4.	Define the term critical velocity.	*2,K1,CO2*
5.	Write down the Equation for calculating length of Back water curve.	*2,K1,CO3*
6.	What are the assumptions made in deriving the dynamic equation of G.V.F?	*2,K1,CO3*
7.	What is celerity?	*2,K1,CO4*
8.	What are the applications of hydraulic jump?	*2,K1,CO4*
9.	Differentiate between turbine and pumps.	*2,K2,CO5*
10.	Give the range of specific speed values of the Kaplan turbine, Francis turbine and Pelton wheel turbine.	*2,K1,CO5*

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

11.	a)	A trapezoidal channel has side slopes of 1 horizontal to 2 vertical and the slope of the bed is 1 in 2000. The area of the section is 42 m^2; Find the dimension of the section if it is most economical. Determine the discharge of the most economical section if C = 60.	*13,K3,CO1*
		OR	
	b)	Find the diameter of a circular sewer pipe which is laid at a slope of 1 in 10000 and carries a discharge of 1000 liters/s when flowing half full. Take the value of Manning's N = 0.02.	*13,K3,CO1*
12.	a)	Derive the conditions for the rectangular section to be most economical.	*13,K3,CO2*

OR

b) Derive Chezy's Equation for open channel flow. *13,K3,CO2*

13. a) Calculate length of back water curve in a rectangular channel that conveys water. The depth of flow at end of control volume is 0.4m and velocity of water is 1 m/s. The depth of flow of the beginning of control volume is 0.2m and velocity of flow is 1.2 m/s. Take i_b = 1 in 2000. i_e = 0.00004. *13,K2,CO3*

OR

b) Derive the Dynamic Equation of Gradually varied flow. *13,K2,CO3*

14. a) A rectangular channel of width 2m conveys 1.5 m^3/s of water with a depth of 0.3m. Check whether hydraulic jump occurs or not. If occurs, (i) Calculate depth of jump (ii) Energy loss. *13,K3,CO4*

OR

b) Derive an expression for energy loss when jump occurs in open channels. *13,K2,CO4*

15. a) (i) Draw neat sketches of the Pelton turbine and Francis Turbine *5,K2,CO5*
(ii) Describe briefly the function of various main components of Pelton turbine with neat sketches. *8,K2,CO5*

OR

b) What do you understand by the characteristic curves of a turbine? Name the important types of characteristic curves. *13,K2,CO5*

PART - C (1 × 15 = 15 Marks)

16. a) A single acting reciprocating pump running at 30 rpm delivers 0.012 m^3/s of water. The diameter of the piston is 25cm and stroke length is 50cm. Determine: (i) The theoretical discharge of the pump, (ii) Co-efficient of discharge, and (iii) Slip and percentage slip of pump. *15,K3,CO6*

OR

b) The centrifugal pump is running at 1000 rpm. The outlet vane angle of the impeller is 30° and velocity of flow at outlet is 3 m/s. If the manometric efficiency of the pump is 75%, Determine: (i) The diameter of the impeller and (ii) The width of the impeller at outlet. *15,K3,CO6*