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KAMALA INSTITUTE OF TECHNOLOGY & SCIENCE, SINGAPUR
23CE28PC404

II. B. Tech. II. Semester Regular Examinations, June-2025

HYDRAULICS AND HYDRAULIC MACHINERY

(CE)

Time: 3 Hours

Max. Marks: 60

Note: Question paper consists of Part-A & Part-B.

i) **Part-A** for 10M, ii) **Part-B** for 50marks

- Part A** is compulsory, consists of 10 sub questions from all units carrying equal marks.
- Part-B** consists of **10 questions** (numbered from 2 to 11) carrying **10marks** each. From each unit there are 2 questions and the students should answer one of them. Hence the student should answer **5 questions** from **Part-B**.

PART-A		(10Marks)	
Q. No	Questions	Marks	BTL
1.a)	Define steady flow and unsteady flow.	1	1
1.b)	What is sub-critical, critical and super critical flows?	1	1
1.c)	What is hydraulic jump?	1	1
1.d)	What is Gradually Varied Flow?	1	1
1.e)	Write formula for efficiency of a series of vanes.	1	1
1.f)	Define the term impact of jet.	1	1
1.g)	Define degree of reaction.	1	1
1.h)	Write the difference between Kaplan turbine and Francis's turbine.	1	1
1.i)	Define mechanical efficiency of a centrifugal pump.	1	1
1.j)	Sketch inlet and outlet velocity triangles of centrifugal pump.	1	2
PART-B		(50Marks)	
Q.No	Questions	Marks	BTL
2. a)	Find the velocity of flow and rate of flow of water through a rectangular channel of 6 m wide and 3 m deep, when it is running full the channel is having bed slope as 1 in 2000. Take Chezy's constant C=55.	10M	3
OR			
3. a)	Find the diameter of a circular sewer pipe which is laid at a slope of 1 in 8000 and carries a discharge of 800 liters/s when flowing half full. Take the value of Manning's N= 0.020.	10M	3
4. a)	Write short note on integration method of solving GVF equation.	5M	2
b)	Define minimum specific energy in terms of critical depth	5M	2
OR			
5. a)	The discharge of water through a rectangular channel of width 8 m, is 15 m ³ /s when the depth of flow of water is 1.2 m. calculate i) specific energy of flowing water	10M	3

	ii) critical depth and critical velocity, iii) value of minimum specific energy.		
6. a)	Derive the equation for the force of impact of a fluid jet on a normal flat vane moving in the direction of jet and the vane velocity is less than jet velocity.	5M	4
b)	A jet of water of diameter 50 mm moves with a velocity of 25 m/s impinges on a fixed curved plate tangentially at one end and at an angle of 30° to the horizontal. Calculate the resultant force of the jet on the plate if the plate is deflected through an angle of 50° .	5M	3
OR			
7. a)	Water is flowing through a pipe at the end of which a nozzle is fitted. The diameter of the nozzle is 100 mm and the head of water at the center nozzle is 100 m. Find the force exerted by the jet of water on a fixed vertical plate the coefficient of velocity is given as 0.95.	5M	3
b)	Explain the significance of dimensional analysis as applied to fluid flow problems.	5M	2
8. a)	Derive the expression for Maximum efficiency of a Pelton Wheel.	10M	4
OR			
9. a)	Give detailed classification of Hydraulic turbines.	5M	2
b)	Explain the working of Kaplan turbine with neat sketch	5M	2
10.a)	Explain the working of centrifugal pump with neat sketch.	10M	2
OR			
11.a)	Derive the expression for work done by the reciprocating pump.	5M	4
b)	List out the difficulties that are generally encountered in operating centrifugal pumps.	5M	2

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