Register Number:……..

B.E/B.TECH DEGREE EXAMINATIONS: NOV / DEC 2024

(Regulation 2018)

Fourth Semester

AUTOMOBILE ENGINEERING

U18AUI4202: Fluid Mechanics and Machinery

COURSE OUTCOMES

CO1: Understand the properties of the fluid, flow concepts and measuring devices.
CO2: Apply the fluid flow concepts and solve the problems.
CO3: Analyse the practical flow problems using mathematical techniques.
CO4: Apply the laws of conservation in flow through pipes.
CO5: Illustrate the working principles of hydraulic machines.

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-
PART A (10 x 2 = 20 Marks)
(Answer not more than 40 words)

1.	Briefly explain Capillarity.	CO1	[K_2]
2.	Define Bulk modulus.	CO1	[K_1]
3.	Write Bernoulli's equation and list all the terms involved in it.	CO2	[K_2]
4.	Differentiate between laminar flow & turbulent flow.	CO2	[K_2]
5.	Define Rayleighs's method of dimensional analysis.	CO3	[K_1]
6.	Explain similitude and enlist the various similarities between a model and a prototype.	CO3	[K_2]
7.	Write Chezy's formula and list all the terms involved in it.	CO4	[K_2]
8.	Enlist the minor losses in a fluid flow.	CO4	[K_1]
9.	Define speed ratio of a turbine.	CO5	[K_1]
10.	Differentiate between impulse turbines and reaction turbines.	CO5	[K_2]

Answer any FIVE Questions:-
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

11.	a)	State hydrostatic law and derive the expression for the same.	8	CO1	[K_2]
	b)	A differential manometer is connected at the two points A and B as shown in Figure below. If air pressure at B is 9.81 N/cm^2 (abs), determine the absolute pressure at A.	8	CO1	[K_3]
12.	a)	Derive the Euler's equation of motion of a stream-line fluid flow.	10	CO2	[K_3]
	b)	An oil of specific gravity 0.8 is flowing through a venturimeter having inlet diameter 20 cm and throat diameter 10 cm. The oil-mercury differential manometer shows a reading of 25 cm of mercury. Calculate the discharge of oil through the horizontal venturimeter. Take C_d = 0.98.	6	CO2	[K_3]
13.	a)	State Buckingham's π theorem and write the procedure for solving a problem by the same by taking any example in fluid flow.	12	CO3	[K_3]
	b)	Determine the dimensions of the quantities given below . 1) Angular velocity 2) Force 3) Discharge 4) Kinematic viscosity	4	CO3	[K_3]
14.	a)	Derive Darcy-Weisbach equation for the loss of head due to friction in pipes.	8	CO4	[K_3]

	b)	A main pipe divides into two parallel pipes which again forms one pipe as shown in Figure below. The length and diameter for the first parallel pipe are 2000 m and 1.0 m respectively, while the length and diameter of 2nd parallel pipe are 2000 m and 0.8 m. Determine the rate of flow in each parallel pipe, if total flow in the main pipe is 3.0 m^3/s. The coefficient of friction for each parallel pipe is same and equal to 0.005.	8	CO4	[K_3]
15.	a)	Explain the construction and working of a Kaplan turbine with a neat sketch.	8	CO5	[K_2]
	b)	Explain the working principle of centrifugal pump with figure.	8	CO5	[K_2]
16.	a)	State and prove Pascal's law.	8	CO1	[K_2]
	b)	Define surface tension and cite examples where it plays a prominent role.	8	CO1	[K_3]

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