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DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE, APRIL – 2025

FLUID MECHANICS & HYDRAULIC MACHINES

[Maximum Marks: **75**]   [Time: **3** Hours]

PART-A
I. Answer *'all'* the following questions in one word or one sentence. Each question carries *'one'* mark.

(9 x 1 = 9 Marks)

		Module Outcome	Cognitive level
1.	The SI unit of viscosity is....................	M1.01	R
2.	A real fluid in which the shear stress is directly proportional to rate of shear strain is known as ....fluid.	M1.02	R
3.	If the Reynolds number is less than 2000, the flow in a pipe is............	M2.01	R
4.	A venturi meter is used for measuring....................	M2.04	R
5.	A prime mover that uses the energy of flowing water and converts it into the mechanical energy is....................	M3.04	R
6.	An example for a tangential flow impulse turbine is....................	M3.05	R
7.	The ratio of power developed by the runner to the power supplied by the jet at entrance to the turbine is known as....................	M3.07	R
8.	The difference between the theoretical discharge and actual discharge of a reciprocating pump is called.....................	M4.07	R
9.	The vertical height of the centerline of pump shaft above the liquid surface in the sump from which the liquid is being raised is known as....................	M4.05	R

PART-B
II. Answer any *'eight'* questions from the following. Each question carries *'three'* marks.

(8 x 3 = 24 Marks)

		Module Outcome	Cognitive level
1.	Explain dynamic viscosity & kinematic viscosity? What are its units?	M1.01	U
2.	Define the following: **(i)** Gauge pressure **(ii)** Vacuum pressure, and **(iii)** Absolute pressure.	M1.03	R
3.	Explain Pascal's Law.	M1.03	U
4.	List the assumptions which are made while deriving Bernoulli's equation	M2.02	R
5.	Explain Continuity Equation.	M2.06	U
6.	Derive the force exerted on a stationary flat plate held normal to the jet.	M3.01	U
7.	How are hydraulic turbines classified?	M3.03	R
8.	Explain the functions of a draft tube.	M3.06	U

9.	State the advantages of a centrifugal pump over a reciprocating pump.	M4.01	R
10.	Describe the working of a hydraulic ram.	M4.08	U

PART-C
Answer *'all'* questions from the following. Each question carries *'seven'* marks.

(6 x 7 = 42 Marks)

Module Outcome Cognitive level

III.	Explain the working of Bourdon tube pressure gauge.	M1.05	U
	OR		
IV.	Explain the classification of Manometers.	M1.05	U
V.	State & derive Bernoulli's equation.	M2.02	U
	OR		
VI.	Explain Hydraulic Coefficients of a Circular orifice.	M2.03	U
VII.	In a smooth inclined pipe of uniform diameter 250 mm, a pressure of 50 kPa was observed at section 1 which was at elevation 10 m. At another section 2 at elevation 12 m, the pressure was 20 kPa and the velocity was 1.25 m/s. Determine the direction of flow and the head loss between these two sections. The fluid in the pipe is water. The density of water at 20°C and 760 mm Hg is 998 kg/m^3.	M2.08	A
	OR		
VIII.	Horizontal venturi meter with inlet diameter 200 mm and throat diameter 100 mm is employed to measure the flow of water. The reading of the differential manometer connected to the inlet is 180 mm of mercury. If the co-efficient of discharge is 0.98, determine the rate of flow.	M2.05	A
IX.	Explain the construction and working principle of Pelton wheel turbine.	M3.05	U
	OR		
X.	Explain the concept of cavitation in turbines.	M3.06	U
XI.	A jet of water strikes with a velocity of 35 m/s on a flat plate inclined at 30° with the axis of the jet. If the cross-sectional area of the jet is 25 cm^2, determine: (i) The force exerted by the jet on the plate, (ii) The components of the force in the direction normal to the jet (iii) The ratio in which the discharge gets divided after striking the plate.	M3.02	A
	OR		
XII.	A single jet Pelton wheel runs at 300 RPM under a head of 510 m. The jet diameter is 200 mm, its deflection inside the bucket is 165° and its relative velocity is reduced by 15% due to friction. Determine the Water power.	M3.07	A
XIII.	Explain the working of Centrifugal pump with neat sketch.	M4.01	U
	OR		
XIV.	Explain the working principle of double acting Reciprocating pumps.	M4.05	U

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