Name : .....
Roll No: .....

MAR ATHANASIUS COLLEGE OF ENGINEERING, KOTHAMANGALAM – 686 666.

DEPARTMENT OF MECHANICAL ENGINEERING (AUTONOMOUS)

FIRST SESSIONAL EXAMINATION, FEBRUARY 2026
S4 MECHANICAL A & B BATCH

B24ME2T07 FLUID MACHINES

Time – 1.5 Hours **Max: 40 Marks**

PART-A
(Answer All Questions.)

1	Find the force exerted by a jet of water of diameter 75 mm on a stationary flat plate, when the jet strikes the plate normally with a velocity of 20 m/s.	**CO1**	**3 Marks**
2	Prove that the maximum efficiency due to force exerted by a jet of water on series of flat vanes mounted on a wheel is 50%.	**CO1**	**3 Marks**
3	Explain the phenomenon of Cavitation in Turbines. What are the harmful effects of cavitation in Turbines and how can the effects be reduced.	**CO2**	**3 Marks**
4	Distinguish between any three types of Draft tubes with the help of figures.	**CO2**	**3 Marks**

PART-B
(Answer All Questions.)

5(a)	The penstock supplies water from a reservoir to the Pelton wheel with a gross head of 500 m. One third of the gross head is lost in friction in the penstock. The rate of flow of water through the nozzle fitted at the end of the penstock is 2.0 m^3/s. The angle of deflection of the jet is 165°. Determine the power given by the water to the runner and also hydraulic efficiency of the Pelton wheel. Take speed ratio = 0.45 and $C_V = 1$.	**CO 1**	**7 Marks**
5(b)	Derive Euler's equation for Hydrodynamic machines.	**CO 1**	**7 Marks**
6(a)	Explain the Degree of Reaction in turbines and derive an equation for the same.	**CO 2**	**7 Marks**
6(b)	A Kaplan turbine working under a head of 20 m develops 11772 kW shaft power. The outer diameter of the runner is 3.5 m and hub diameter is 1.75 m. The guide blade angle at the extreme edge of the runner is 35°. The hydraulic and overall efficiencies of the turbines are 88% and 84% respectively. If the velocity of whirl is zero at outlet, determine: (i) Runner vane angles at inlet and outlet at the extreme edge of the runner, and (ii) Speed of the turbine.	**CO 2**	**7 Marks**