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BACHELOR OF TECHNOLOGY (C.B.C.S.) (2014 COURSE)
B.Tech.Sem - IV CIVIL :SUMMER- 2022
SUBJECT : MECHANICS OF FLUID

Day : Thursday
Date : 16-06-2022

S-12711-2022

Time : 10:00 AM-01:00 PM
Max. Marks : 60

N.B.:

- 1) All questions are **COMPULSORY**.
 - 2) Figures to the right indicate **FULL** marks.
 - 3) Assume suitable data if necessary.
 - 4) Non-programmable **CALCULATOR** is allowed.
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- Q.1 a)** A Circular plate of 2.5m diameter is immersed in water vertically such that top edge of plate is at 1.5m from the water surface. Determine: **(05)**
i) The total pressure on one face of the plate
ii) The position of Centre of pressure

- b)** What is metacenter and meta centric height? **(05)**

OR

- Q.1 a)** The density of a liquid is 350kg/m^3 , find its specific weight, specific gravity and specific volume. If kinematic viscosity of liquid is $1.2\text{cm}^2/\text{sec}$, obtain its dynamic viscosity. **(05)**

- b)** What is dynamic and kinematic viscosity of fluid? **(05)**

- Q.2 a)** Define the following: i) Rotational flow ii) 3-Dimensional flow **(05)**

- b)** A stream function is given by $\Psi = 3x^2 - y^3$. Determine magnitude of velocity components at the point (2, 1). **(05)**

OR

- Q.2 a)** Define: i) Velocity Potential Function ii) Stream Function **(05)**

- b)** A 100cm diameter pipe branches in to two 50 cm diameter pipes. If the velocity of flow in 100 cm diameter pipe is 0.35 m/s and velocity in one of the 50 cm diameter pipe is 0.3m/s find the velocity of flow in other pipe. **(05)**

- Q.3 a)** What is impulse momentum equation? **(05)**

- b)** A 0.3m diameter pipe carries water at a velocity of 20.0m/s. At points A and B measurements of pressures and elevations were respectively 350kN/m^2 and 250kN/m^2 and 30m and 35.0m. For steady flow, find the loss of head between A and B. **(05)**

OR

- Q.3 a)** What is Total Energy Line and Hydraulic Grade Line? **(05)**

- b)** A smooth inclined pipe of uniform diameter 300mm, a pressure of 35kPa was observed at section 1-1 which is at elevation of 5m. Section 2-2 which is at elevation of 9m, the pressure is 25kPa and velocity is 0.75m/s. Determine the direction of flow and head loss between the two sections. Take water density = 998kg/m^3 . **(05)**

P.T.O.
