MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
(A constituent unit of MAHE, Manipal)

III SEMESTER B.TECH. (AUTOMOBILE ENGINEERING)

END SEMESTER ONLINE PROCTORED EXAMINATIONS, JAN 2022

SUB: FLUID MECHANICS [AAE-2159]

REVISED CREDIT SYSTEM

(31/01/2022)

Duration: 1 Hour 15 min | Max. Marks: 20

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data if any, may be suitably be assumed.

Q. No	Question	Max. Marks	CO	BT Level
1	Two reservoir are connected by a pipe line of diameter 600 mm and length 4000 m. The difference of water level in the reservoir is 20 m. At a distance of 1000 m from the upper reservoir, a small pipe is connected to the pipe line. The water can be taken from the small pipe. Find the discharge to the lower reservoir, if 100 litres/s of water is taken from small pipe and no water is taken from the small pipe.	(04)	CO2	L2
2	A gas is flowing through a horizontal pipe which is having area cross section as 40 cm^2 where pressure is 40 N/cm^2 (gauge) and temperature 15^0 C. At another section the area of cross section is 20 cm^2 and pressure is 30 N/cm^2 (gauge). If the mass rate of flow of gas through the pipe is 0.5 kg/s, find the velocities of the gas of at these sections assuming an isothermal change. Take R = 292 N-m/kg^{0}K, and atmospheric pressure = 10 N/cm^2.	(04)	CO5	L3
3	What is boundary layer? Explain its role in vehicle aerodynamics field.	(02)	CO3	L1
4	For the velocity profile for laminar boundary layer flows given as $\frac{u}{U} = 2\left(\frac{y}{\delta}\right) - 2\left(\frac{y}{\delta}\right)^3 + \left(\frac{y}{\delta}\right)^4$ obtain an expression for boundary layer thickness, shear stress, the drag force on one side of the plate, and coefficient of drag in terms of Reynolds number.	(06)	CO4	L5
5	With the help of neat diagrams explain the role of "Fluid Mechanics" in aerodynamics with the suitable examples.	(04)	CO1	L4