Reg. No.



III SEMESTER B.TECH. CHEMICAL ENGINEERING) END SEMESTER MAKE UP EXAMINATIONS, DECEMBER- 2016 SUBJECT: MOMENTUM TRANSFER [CHE 2102]

REVISED CREDIT SYSTEM

(26/12/2016)

Time: 3 Hours

MAX. MARKS: 100

Instructions to Candidates:

- ✤ Answer ALL the questions.
- Missing data may be suitable assumed.

1A.	What is meant by hydrostatic equilibrium? Derive the expression for it and then deduce the Barometric equation.	08
1B.	Hydrogen gas flows at a velocity of 50 m/s under a pressure of 1.3 bars absolute. If the temperature of the gas is 25oC, at what Mach number does the flow takes place? Assume n=1 for hydrogen gas.	05
1C.	Explain the basic hydrodynamic behavior and applications of fluidized beds.	07
2A.	Derive Bernoulli's equation. State all assumptions. Explain the correction factors to be incorporated in the equation.	08
2B.	Define: i) Prandtl's mixing length ii) Hydraulically smooth pipe.	04
2C.	Water at 15°C is pumped from a large reservoir to the bottom of an open tank 10m above the reservoir surface through 12cm I.D. pipe at a rate of 12 liters per second. The total energy loss due to friction in the piping system is 125 J/Kg. Calculate the HP required for the pump which has the overall efficiency of 60%.	08
3A.	Derive the Von Karmen's universal velocity distribution equation for turbulent flow through a circular pipe.	07
3B.	Explain the terms the drag and drag coefficient.	06
3C.	A circular plate of 0.75 m diameter moves at 40 km/hr speed in stationary air of 11.28 N/m ³ . If the drag coefficient is 0.15, determine the drag force and the power required to keep the plate in motion.	07
4A.	Crude oil of density 850 Kg/m ³ flows through a vertical venturimeter upwards at a rate of 0.06m3/sec. The inlet dia and throat dia are 20 cms and 10 cms respectively. The coefficient of meter is 0.98. The vertical distance between the pressure tappings is 30 cms and they are connected to two pressure gauges calibrated in KN/m ² . Determine the difference of the readings of the two gauges. Derive the equation used here. If they are connected to U tube mercury manometer, what will be the reading of the manometer?	10
4B.	Explain the advantages of centrifugal pumps over reciprocating pumps.	04

4C.	Explain the principle and working of Rotameter.	06
5A.	A gaseous fuel of molecular weight 29 is at a steady flow through a nozzle of 2.5 cm diameter to the furnace where the pressure is 1 atm. The temperature and pressure of the gas at the entrance to the nozzle are 170C and 2.632 atm. If the expansion factor is 1.4 and the coefficient of the nozzle is 0.95, calculate the mass flow rate. Derive the equation used here.	10
5B.	Explain the importance of Dimensional analysis.	06
5C.	What diameter pipe will deliver oil at a Reynolds number of 2000 and at 170 liters per minute? The kinematic viscosity of oil is 2.3x10-2 m ² /hr.	04