Registration No.										

Total number of printed pages - 02

B.TECH
PCCH4201

3rd Semester Back Examination 2016 - 17
FLUID FLOW & FLOW MEASUREMENT
BRANCH : Chemical
Time : 3 Hours
Max Marks : 70
Question Code : Y488

Answer Question No. 1 which is compulsory and any FIVE from the rest.
The figures in the right-hand margin indicate marks.
Assume suitable notations and any missing data wherever necessary.
Answer all parts of a question at a place.

1. **Answer the following questions :** **2 x 10**

(a) What are compressible and incompressible fluids ?
(b) Write the Barometric equation and mention its use.
(c) What is the effect of temperature on the viscosity of gases and liquids?
(d) Differentiate between wall turbulence and free turbulence.
(e) Mention the values of kinetic energy correction factor for laminar and turbulent flows.
(f) Define hydraulic radius for non-circular channels.
(g) What do you understand by a hydraulically smooth tube ?
(h) What is drag coefficient?
(i) What is particulate fluidization?
(j) Recovery of pressure loss in venturimeter is more. Justify.

2. A lube is flowing through a 15 cm steel pipe at a rate of 1500 l/min. A 10 cm sharp edged orifice is inserted to this steel pipe. A mercury manometer is attached to the orifice meter. At the flow temperature, the oil has a specific gravity of 0.80 and viscosity of 15 cP. If one of the arms of the manometer tube is inclined at an angle of 30^0 to the horizontal, what would be the manometer reading measured along the sloping arm? Orifice coefficient is 0.62 and density of mercury is 13.6 gm/cm^3. **10**

3. **(a)** Water at 25^0C is flowing through a 500 m horizontal pipe at 454.5 l/min. A head of 10 m is available. If the friction factor for this condition is 0.0048, find the pipe diameter. **05**
(b) Draw and explain the Prandtl boundary layer. **05**

4. With a neat diagram, derive the Bernoulli equation without friction. **10**

5. Prove that, in laminar flow the velocity distribution with respect to the radius is a parabola with the apex at the centerline of the pipe. **10**

6. Discuss the types of fluidization. Also mention the applications of fluidization. **5+5**

7. With a neat sketch, discuss the construction and working of:

i. Venturimeter **05**

ii. Rotameter **05**

8. **Write short notes on any TWO**: **5 x 2**

(a) Inclined manometer

(b) Separation of boundary layer due to velocity decrease

(c) Orifice meter

(d) Centrifugal pump
