Code No: 07A30801 **R07** **Set No. 2**

II B.Tech I Semester Examinations,MAY 2011
MOMENTUM TRANSFER
Chemical Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks
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1. Calculate the different settling velocities for spherical quartz particles of following diameter 100, 400, 600, 900 mm settling in water at 20 ^{0}C. Density of quartz = 2650 Kg/m^3, Density of water = 1000 Kg/m^3 Viscosity of water =1cp.
   Show graphically how the settling velocity changes with the variation of particles diameter. [16]

2. (a) Define 'Equivalent diameter' for fluid flow through ducts of noncircular diameter.
   (b) Calculate the hydraulic mean diameter of the annular space between a 4 cm and 6 cm tubes.
   (c) Draw velocity profile for laminar flow in a circular pipe. [5+5+6]

3. (a) State the Bernoullis equation? Explain the significance of each term.
   (b) Write any two applications of the Bernoullis equation.
   (c) Write short notes on Average velocity. [8+4+4]

4. (a) Derive the condition for hydrostatic equilibrium and deduce the barometric equation.
   (b) What are the required characteristics of the manometric fluid. [12+4]

5. (a) Define the terms Mach number and sonic velocity.
   (b) Explain about convergent -divergent nozzle. [8+8]

6. (a) How can it be said that a suspension, when fluidized, behaves like a dense fluid?
   (b) Write on entrainment. [16]

7. Brine is to be pumped through 35 meters of smooth copper tube of 2.5 cm ID. For a flow rate of 95 LPM, calculate:
   (a) The pressure drop due to friction and
   (b) Power required to overcome friction. Density and viscosity of brine 1.18 g/cc and 2.5 cP, respectively. Friction factor may be estimated from 0.0014 + 0.125/Re$^{0.32}$. [16]

8. (a) Obtain an expression to estimate venturi coefficient.

(b) A horizontal venturi meter having a throat diameter of 20 mm is placed in a 75-mm ID pipeline, through which water is flowing at 15 ^{0}C. A mercury manometer gives a reading of 500 mm. Determine the water flow rate. [16]

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Code No: 07A30801 **R07** **Set No. 4**

II B.Tech I Semester Examinations,MAY 2011
MOMENTUM TRANSFER
Chemical Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Define 'Equivalent diameter' for fluid flow through ducts of noncircular diameter.
   (b) Calculate the hydraulic mean diameter of the annular space between a 4 cm and 6 cm tubes.
   (c) Draw velocity profile for laminar flow in a circular pipe. [5+5+6]

2. Brine is to be pumped through 35 meters of smooth copper tube of 2.5 cm ID. For a flow rate of 95 LPM, calculate:
   (a) The pressure drop due to friction and
   (b) Power required to overcome friction. Density and viscosity of brine 1.18 g/cc and 2.5 cP, respectively. Friction factor may be estimated from $0.0014 + 0.125/Re^{0.32}$. [16]

3. (a) Define the terms Mach number and sonic velocity.
   (b) Explain about convergent -divergent nozzle. [8+8]

4. (a) Obtain an expression to estimate venturi coefficient.
   (b) A horizontal venturi meter having a throat diameter of 20 mm is placed in a 75-mm ID pipeline, through which water is flowing at 15 ^{0}C. A mercury manometer gives a reading of 500 mm. Determine the water flow rate. [16]

5. (a) State the Bernoullis equation? Explain the significance of each term.
   (b) Write any two applications of the Bernoullis equation.
   (c) Write short notes on Average velocity. [8+4+4]

6. (a) How can it be said that a suspension, when fluidized, behaves like a dense fluid?
   (b) Write on entrainment. [16]

7. (a) Derive the condition for hydrostatic equilibrium and deduce the barometric equation.
   (b) What are the required characteristics of the manometric fluid. [12+4]

8. Calculate the different settling velocities for spherical quartz particles of following diameter 100, 400, 600, 900 mm settling in water at 20 ^{0}C. Density of quartz = 2650 Kg/m^3, Density of water = 1000 Kg/m^3 Viscosity of water =1cp.
   Show graphically how the settling velocity changes with the variation of particles diameter. [16]

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Code No: 07A30801 **R07** **Set No. 1**

II B.Tech I Semester Examinations,MAY 2011
MOMENTUM TRANSFER
Chemical Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Obtain an expression to estimate venturi coefficient.
   (b) A horizontal venturi meter having a throat diameter of 20 mm is placed in a 75-mm ID pipeline, through which water is flowing at 15 ^{0}C. A mercury manometer gives a reading of 500 mm. Determine the water flow rate. [16]
2. (a) How can it be said that a suspension, when fluidized, behaves like a dense fluid?
   (b) Write on entrainment. [16]
3. (a) State the Bernoullis equation? Explain the significance of each term.
   (b) Write any two applications of the Bernoullis equation.
   (c) Write short notes on Average velocity. [8+4+4]
4. (a) Define 'Equivalent diameter' for fluid flow through ducts of noncircular diameter.
   (b) Calculate the hydraulic mean diameter of the annular space between a 4 cm and 6 cm tubes.
   (c) Draw velocity profile for laminar flow in a circular pipe. [5+5+6]
5. (a) Derive the condition for hydrostatic equilibrium and deduce the barometric equation.
   (b) What are the required characteristics of the manometric fluid. [12+4]
6. (a) Define the terms Mach number and sonic velocity.
   (b) Explain about convergent -divergent nozzle. [8+8]
7. Calculate the different settling velocities for spherical quartz particles of following diameter 100, 400, 600, 900 mm settling in water at 20 ^{0}C. Density of quartz = 2650 Kg/m^3, Density of water = 1000 Kg/m^3 Viscosity of water =1cp.
   Show graphically how the settling velocity changes with the variation of particles diameter. [16]
8. Brine is to be pumped through 35 meters of smooth copper tube of 2.5 cm ID. For a flow rate of 95 LPM, calculate:
   (a) The pressure drop due to friction and

(b) Power required to overcome friction. Density and viscosity of brine 1.18 g/cc and 2.5 cP, respectively. Friction factor may be estimated from $0.0014 + 0.125/\mathrm{Re}^{0.32}$. [16]

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Code No: 07A30801 **R07** **Set No. 3**

II B.Tech I Semester Examinations,MAY 2011
MOMENTUM TRANSFER
Chemical Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Define the terms Mach number and sonic velocity.
   (b) Explain about convergent -divergent nozzle. [8+8]
2. Calculate the different settling velocities for spherical quartz particles of following diameter 100, 400, 600, 900 mm settling in water at 20 ^{0}C. Density of quartz = 2650 Kg/m^3, Density of water = 1000 Kg/m^3 Viscosity of water =1cp.
   Show graphically how the settling velocity changes with the variation of particles diameter. [16]
3. Brine is to be pumped through 35 meters of smooth copper tube of 2.5 cm ID. For a flow rate of 95 LPM, calculate:
   (a) The pressure drop due to friction and
   (b) Power required to overcome friction. Density and viscosity of brine 1.18 g/cc and 2.5 cP, respectively. Friction factor may be estimated from $0.0014 + 0.125/Re^{0.32}$. [16]
4. (a) Define 'Equivalent diameter' for fluid flow through ducts of noncircular diameter.
   (b) Calculate the hydraulic mean diameter of the annular space between a 4 cm and 6 cm tubes.
   (c) Draw velocity profile for laminar flow in a circular pipe. [5+5+6]
5. (a) Obtain an expression to estimate venturi coefficient.
   (b) A horizontal venturi meter having a throat diameter of 20 mm is placed in a 75-mm ID pipeline, through which water is flowing at 15 ^{0}C. A mercury manometer gives a reading of 500 mm. Determine the water flow rate. [16]
6. (a) Derive the condition for hydrostatic equilibrium and deduce the barometric equation.
   (b) What are the required characteristics of the manometric fluid. [12+4]
7. (a) How can it be said that a suspension, when fluidized, behaves like a dense fluid?
   (b) Write on entrainment. [16]
8. (a) State the Bernoullis equation? Explain the significance of each term.
   (b) Write any two applications of the Bernoullis equation.

(c) Write short notes on Average velocity. [8+4+4]

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