

Code No: RR210106

RR

Set No. 2

II B.Tech I Semester Examinations, November 2010

FLUID MECHANICS

Civil Engineering

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Differentiate between
 - i. Stream line body and bluff body
 - ii. Friction drag and pressure drag.
- (b) A kite 60cm x 60cm weighing 2.943 N assumes an angle of 10° to the horizontal. If the pull on the string is 29.43N when the wind is flowing at a speed of 40 km/hr. Find the corresponding coefficient of drag and lift. Density of air is given as 1.25 kg/m^3 . [8+8]
2. A vertical gate of width 2.0 m and height 2.5 m controls a sluice opening in a dam. The top of the gate is 10 m below the water surface. If the gate weighs 80 kN, find the vertical force required to raise the gate. The coefficient of friction between the gate and the guides can be assumed to be 0.25. Neglect buoyancy effect on the gate. [16]
3. (a) Explain notches and weirs?
- (b) A right angled triangular notch is provided in the vertical side of a tank having plan area of 0.93 m^2 uniform at all levels. When the head over the notch is 75 mm it is found that the water surface in the tank is falling down at a rate of 2.54 mm per second, Find c_d of the notch.
- (c) What is meant by still water head and velocity of approach? [5+6+5]
4. (a) Show that discharge per unit width between two parallel plates distance b apart, when one plate is moving at velocity U while the other one is held stationary, for the condition of zero shear stress at the fixed plate is $q = bu/3$.
- (b) A horizontal pipe line 20cm in diameter, 70m long conveys oil of specific gravity 0.95 and viscosity 0.23 NS/m². If the velocity of the oil is 1.38 m/sec, find the difference in pressure between the two ends of the pipe. [8+8]
5. (a) Explain local and convective acceleration.
- (b) Show that $\Psi = 1.73y - x$ represents uniform flow with a velocity of 2 m/s at an angle of 30° to the X - axis. [8+8]
6. A pipe 0.15 m diameter taking off from a reservoir suddenly expands to 0.3 m at the end of 16 m and continues for another 15 m. If the head above the inlet of the pipe is 4.88 m determine the actual velocity at the exit, taking into consideration all the losses. Take $f = 0.04$ for the complete pipe line. [16]

Code No: RR210106

RR

Set No. 2

7. (a) A pipe 12.5 cm in diameter is connected to a nozzle of 2.5 cm diameter by a flanged joint. If the nozzle discharges with a velocity of 43.2 m/s, find the magnitude and direction of force in the flanged connections.
- (b) Water is pumped at the rate of 200 l/s through a 30 cm pipe upto a hill top. If the pump maintains a pressure of 150 kN/m^2 at the hill top at an elevation of 45 m, What is the pressure at the foot hills at zero elevation. Neglecting losses, What is the power required to pump the water? [8+8]
8. (a) What are the density, Specific weight, Specific volume and Kinematic viscosity of a liquid in S.I. units, if its relative density is 0.804 and dynamic viscosity is 9.8 poise. Express your answer in C.G.S. units also.
- (b) A liquid occupying a volume of 0.225 m^3 , has a weight of 1.89 kN. What are its density, relative density, Specific weight and Specific volume? [8+8]

Code No: RR210106

RR

Set No. 4

II B.Tech I Semester Examinations, November 2010

FLUID MECHANICS

Civil Engineering

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Explain notches and weirs?
(b) A right angled triangular notch is provided in the vertical side of a tank having plan area of $0.93m^2$ uniform at all levels. When the head over the notch is 75 mm it is found that the water surface in the tank is falling down at a rate of 2.54 mm per second, Find c_d of the notch.
(c) What is meant by still water head and velocity of approach? [5+6+5]
2. A pipe 0.15 m diameter taking off from a reservoir suddenly expands to 0.3 m at the end of 16 m and continues for another 15 m. If the head above the inlet of the pipe is 4.88 m determine the actual velocity at the exit, taking into consideration all the losses. Take $f = 0.04$ for the complete pipe line. [16]
3. A vertical gate of width 2.0 m and height 2.5 m controls a sluice opening in a dam. The top of the gate is 10 m below the water surface. If the gate weighs 80 kN, find the vertical force required to raise the gate. The coefficient of friction between the gate and the guides can be assumed to be 0.25. Neglect buoyancy effect on the gate. [16]
4. (a) A pipe 12.5 cm in diameter is connected to a nozzle of 2.5 cm diameter by a flanged joint. If the nozzle discharges with a velocity of 43.2 m/s, find the magnitude and direction of force in the flanged connections.
(b) Water is pumped at the rate of 200 l/s through a 30 cm pipe upto a hill top. If the pump maintains a pressure of 150 kN/m^2 at the hill top at an elevation of 45 m, What is the pressure at the foot hills at zero elevation. Neglecting losses, What is the power required to pump the water? [8+8]
5. (a) Explain local and convective acceleration.
(b) Show that $\Psi = 1.73y - x$ represents uniform flow with a velocity of 2 m/s at an angle of 30° to the X - axis. [8+8]
6. (a) What are the density, Specific weight, Specific volume and Kinematic viscosity of a liquid in S.I. units, if its relative density is 0.804 and dynamic viscosity is 9.8 poise. Express your answer in C.G.S. units also.
(b) A liquid occupying a volume of 0.225 m^3 , has a weight of 1.89 kN. What are its density, relative density, Specific weight and Specific volume? [8+8]
7. (a) Differentiate between
 - i. Stream line body and bluff body

Code No: RR210106

RR

Set No. 4

- ii. Friction drag and pressure drag.
- (b) A kite 60cm x 60cm weighing 2.943 N assumes an angle of 10° to the horizontal. If the pull on the string is 29.43N when the wind is flowing at a speed of 40 km/hr. Find the corresponding coefficient of drag and lift. Density of air is given as 1.25 kg/m^3 . [8+8]
8. (a) Show that discharge per unit width between two parallel plates distance b apart, when one plate is moving at velocity U while the other one is held stationary, for the condition of zero shear stress at the fixed plate is $q = bu/3$.
- (b) A horizontal pipe line 20cm in diameter, 70m long conveys oil of specific gravity 0.95 and viscosity 0.23 NS/m². If the velocity of the oil is 1.38 m/sec, find the difference in pressure between the two ends of the pipe. [8+8]

Code No: RR210106

RR

Set No. 1

II B.Tech I Semester Examinations, November 2010

FLUID MECHANICS

Civil Engineering

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Explain notches and weirs?
(b) A right angled triangular notch is provided in the vertical side of a tank having plan area of $0.93m^2$ uniform at all levels. When the head over the notch is 75 mm it is found that the water surface in the tank is falling down at a rate of 2.54 mm per second, Find c_d of the notch.
(c) What is meant by still water head and velocity of approach? [5+6+5]
2. A vertical gate of width 2.0 m and height 2.5 m controls a sluice opening in a dam. The top of the gate is 10 m below the water surface. If the gate weighs 80 kN, find the vertical force required to raise the gate. The coefficient of friction between the gate and the guides can be assumed to be 0.25. Neglect buoyancy effect on the gate. [16]
3. (a) Explain local and convective acceleration.
(b) Show that $\Psi = 1.73y - x$ represents uniform flow with a velocity of 2 m/s at an angle of 30° to the X - axis. [8+8]
4. (a) Show that discharge per unit width between two parallel plates distance b apart, when one plate is moving at velocity U while the other one is held stationary, for the condition of zero shear stress at the fixed plate is $q = bu/3$.
(b) A horizontal pipe line 20cm in diameter, 70m long conveys oil of specific gravity 0.95 and viscosity 0.23 NS/m². If the velocity of the oil is 1.38 m/sec, find the difference in pressure between the two ends of the pipe. [8+8]
5. (a) What are the density, Specific weight, Specific volume and Kinematic viscosity of a liquid in S.I. units, if its relative density is 0.804 and dynamic viscosity is 9.8 poise. Express your answer in C.G.S. units also.
(b) A liquid occupying a volume of $0.225 m^3$, has a weight of 1.89 kN. What are its density, relative density, Specific weight and Specific volume? [8+8]
6. A pipe 0.15 m diameter taking off from a reservoir suddenly expands to 0.3 m at the end of 16 m and continues for another 15 m. If the head above the inlet of the pipe is 4.88 m determine the actual velocity at the exit, taking into consideration all the losses. Take $f = 0.04$ for the complete pipe line. [16]
7. (a) A pipe 12.5 cm in diameter is connected to a nozzle of 2.5 cm diameter by a flanged joint. If the nozzle discharges with a velocity of 43.2 m/s, find the magnitude and direction of force in the flanged connections.

Code No: RR210106

RR

Set No. 1

- (b) Water is pumped at the rate of 200 l/s through a 30 cm pipe upto a hill top. If the pump maintains a pressure of 150 kN/m^2 at the hill top at an elevation of 45 m, What is the pressure at the foot hills at zero elevation. Neglecting losses, What is the power required to pump the water? [8+8]
8. (a) Differentiate between
- Stream line body and bluff body
 - Friction drag and pressure drag.
- (b) A kite 60cm x 60cm weighing 2.943 N assumes an angle of 10° to the horizontal. If the pull on the string is 29.43N when the wind is flowing at a speed of 40 km/hr. Find the corresponding coefficient of drag and lift. Density of air is given as 1.25 kg/m^3 . [8+8]

Code No: RR210106

RR

Set No. 3

II B.Tech I Semester Examinations, November 2010

FLUID MECHANICS

Civil Engineering

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Show that discharge per unit width between two parallel plates distance b apart, when one plate is moving at velocity U while the other one is held stationary, for the condition of zero shear stress at the fixed plate is $q = bu/3$.
(b) A horizontal pipe line 20cm in diameter, 70m long conveys oil of specific gravity 0.95 and viscosity 0.23 NS/m². If the velocity of the oil is 1.38 m/sec, find the difference in pressure between the two ends of the pipe. [8+8]
2. A vertical gate of width 2.0 m and height 2.5 m controls a sluice opening in a dam. The top of the gate is 10 m below the water surface. If the gate weighs 80 kN, find the vertical force required to raise the gate. The coefficient of friction between the gate and the guides can be assumed to be 0.25. Neglect buoyancy effect on the gate. [16]
3. (a) Explain local and convective acceleration.
(b) Show that $\Psi = 1.73y - x$ represents uniform flow with a velocity of 2 m/s at an angle of 30° to the X - axis. [8+8]
4. A pipe 0.15 m diameter taking off from a reservoir suddenly expands to 0.3 m at the end of 16 m and continues for another 15 m. If the head above the inlet of the pipe is 4.88 m determine the actual velocity at the exit, taking into consideration all the losses. Take $f = 0.04$ for the complete pipe line. [16]
5. (a) Explain notches and weirs?
(b) A right angled triangular notch is provided in the vertical side of a tank having plan area of $0.93m^2$ uniform at all levels. When the head over the notch is 75 mm it is found that the water surface in the tank is falling down at a rate of 2.54 mm per second, Find c_d of the notch.
(c) What is meant by still water head and velocity of approach? [5+6+5]
6. (a) What are the density, Specific weight, Specific volume and Kinematic viscosity of a liquid in S.I. units, if its relative density is 0.804 and dynamic viscosity is 9.8 poise. Express your answer in C.G.S. units also.
(b) A liquid occupying a volume of $0.225 m^3$, has a weight of 1.89 kN. What are its density, relative density, Specific weight and Specific volume? [8+8]
7. (a) Differentiate between
 - i. Stream line body and bluff body

Code No: RR210106

RR

Set No. 3

- ii. Friction drag and pressure drag.
- (b) A kite 60cm x 60cm weighing 2.943 N assumes an angle of 10° to the horizontal. If the pull on the string is 29.43N when the wind is flowing at a speed of 40 km/hr. Find the corresponding coefficient of drag and lift. Density of air is given as 1.25 kg/m^3 . [8+8]
8. (a) A pipe 12.5 cm in diameter is connected to a nozzle of 2.5 cm diameter by a flanged joint. If the nozzle discharges with a velocity of 43.2 m/s, find the magnitude and direction of force in the flanged connections.
- (b) Water is pumped at the rate of 200 l/s through a 30 cm pipe upto a hill top. If the pump maintains a pressure of 150 kN/m^2 at the hill top at an elevation of 45 m, What is the pressure at the foot hills at zero elevation. Neglecting losses, What is the power required to pump the water? [8+8]
