SE Civil III CBSGS

3 Hours   Max Marks: 80

12.6.17

N.B.   1. Question No. 1 is compulsory

2. Solve any three question of the remaining questions

3. Assume suitable data if required

4. Draw neat figure

Q.1. Attempt any four   (20)

(a) What is the difference between dynamic viscosity and kinematic viscosity? State their Units of measurement.

(b) Explain the procedure of finding hydrostatic forces on curved surfaces.

(c) What are the conditions of equilibrium of a floating body and submerged body?

(d) Sketch the flow pattern of an ideal fluid flow passed past a cylinder with circulation.

(e) Describe with a help of sketch the construction and use of pitot static cube.

(f) Explain the classification of orifices and mouth pieces based on their shape, size and Sharpness?

Q.2. (a) A soap bubble 51mm in diameter has an internal pressure in excess of outside pressure of 0.00021 Kg(f)/cm². Calculate the tension in soap fill.   (05)

(b) A U-tube differential manometer connects to pressure pipe A and B. Pipe A contains carbon tetrachloride having specific gravity 1.594 under a pressure of 1.2kg(f)/cm² and pipe B contains oil of specific gravity 0.8 under a pressure of 2kg(f)/cm². Pipe A lies 2.5m above pipe B. Find the difference of pressure measured by mercury as fluid filling U-tube. Mercury level in left limb is 3.75m below pipe A.   (10)

(c) Define the fluid properties (i) Density. (ii) Specific volume. Also give its SI Unit.   (05)

Q.3. (a) What is the difference between Sluice gate and Lock gate?   (04)

(b) A hollow circular plate of 2m external diameter and 1m internal diameter is immersed Vertically in water such that the centre of plate is 4m deep from water surface. Find the Total pressure and depth of centre of pressure.   (10)

(c) A rectangular Pontoon is 4m long, 3m wide and 1.4m high in sea water. If the Centre of gravity is 0.7m above the Pontoon, determine the meta centric height. Take the density of sea water as 1030Kg/m³.   (06)

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Q.4. (a) The velocity components in two dimensional flow field for an in-compressible

Fluid are expressed as u = $(y^3/3) + 2x - (x^2y)$, v = $xy^2 - 2y - (x^3/3)$ (10)

   (i) Show that these functions represent a possible case of an ir-rotational

     flow.

   (ii) Obtain an expression for stream function Ψ.

   (iii) Obtain an expression for velocity potential Ø.

(b) Define the equation of continuity. Obtain an expression for continuity equation for

   a three dimensional flow.   (10)

Q.5. (a) Explain the principle of venturimetre with a neat sketch. Derive the expression

   For the rate of flow of fluid through it.   (10)

(b) A pipe line carrying oil of specific gravity 0.87 changes in diameter from 300mm

   Diameter at a position A to 600mm diameter at a position B which is 4m at a

   higher level. If the pressure at A and B are 9.81 N/cm² and 5.886 N/cm²

   respectively and the discharge is 200 lit/s. Determine the loss of head and direction

   of flow.   (10)

Q.6. (a) What do you understand by velocity of approach? Find an expression for the   (10)

   Discharge over a rectangular weir with velocity approach.

(b) A broad crested weir of 50m length has 50cm height of water above its crest

   (i) Find the maximum discharge. Take Cd = 0.60. Neglect velocity of approach.

   (ii) If the velocity of approach is to be taken into consideration. Find the maximum

     discharge when the channel has a cross sectional area of 50m² on the upstream

     side.   (06)

(c) What is the difference between a notch and weir?   (04)

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