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BICE-028

DIPLOMA – VIEP – CIVIL ENGINEERING (DCLEVI)

Term-End Examination

00554

June, 2017

BICE-028 : FLUID MECHANICS

Time : 2 hours *Maximum Marks : 70*

Note : *Attempt any* ***five*** *questions. Question no.* ***1*** *is* ***compulsory.*** ***Four*** *questions are to be attempted out of the remaining questions. Use of scientific calculator is permitted. Assume missing data, if any.*

1. Write the correct answer for the following : *7×2=14*

(a) Specific volume of a fluid is

(i) the same as density of the fluid

(ii) the inverse of density of the fluid

(iii) volume of the fluid × specific gravity of the fluid

(iv) density of the fluid × specific gravity of the fluid

(b) Following has the unit of Poise in CGS system :

(i) Density

(ii) Specific gravity

(iii) Kinetic energy

(iv) Viscosity

(c) Manometers are used for the measurement of

(i) Pressure

(ii) Velocity

(iii) Momentum

(iv) Depth

(d) Flow is termed uniform if the fluid velocity

(i) does not change at a point with time

(ii) does not change with distance at a given time

(iii) constantly changes with respect to space

(iv) None of these

(e) Bernoulli's equation is based on the following assumption(s) :

(i) Flow is ideal

(ii) Flow is steady

(iii) Both (i) and (ii)

(iv) Flow is laminar

(f) A venturimeter does ***not*** have the following :

(i) Converging part

(ii) Throat

(iii) Diverging part

(iv) Orifice

(g) The flow through an open channel will be termed sub-critical, if

(i) Froude number > 1

(ii) Froude number < 1

(iii) Reynolds number < 1

(iv) Reynolds number > 1

2. (a) Define laminar and turbulent flow. *4*

(b) A 25 cm diameter pipe carries oil of specific gravity 0·9 at a velocity of 3 m/s. At another section, the diameter is 20 cm. Find the velocity at this section and also the mass rate of oil flow. *10*

3. (a) Write the Euler's equation of motion. *4*

(b) Water is flowing through a pipe having diameters 20 cm and 10 cm at sections 1 and 2, respectively. The rate of flow through the pipe is 35 *l*/s. Section 1 is 6 m above the datum and section 2 is 4 m above the datum. If the pressure at section 1 is 39·24 N/cm^2, find the intensity of pressure at Section 2. *10*

4. (a) Discuss the experimental determination of coefficient of contraction, velocity and discharge. 7

(b) A hemispherical cistern of 6 m radius is full of water. It is fitted with a 75 mm diameter sharp edged orifice, at the bottom. Calculate the time required to lower the level in the cistern by 2 m. Assume C_d of the orifice as 0·6. 7

5. (a) What are the various minor losses through pipes ? 6

(b) Water is flowing through a horizontal pipe of diameter 200 mm at a velocity of 3 m/s. A circular solid plate of diameter 150 mm is placed in the pipe to obstruct the flow. Find the head loss due to this obstruction, if $C_c = 0{\cdot}62$. 8

6. (a) Find the slope of bed of a rectangular channel of width 5 m and water depth of 2 m. Rate of flow is 2·0 m^3/s. Assume Chezy's constant, C = 50. 6

(b) Find the maximum discharge through a circular channel of diameter 1·5 m when the bed slope of the channel is 1 in 1000. Take C = 60. 8

7. Write short notes on any ***four*** of the following : $4 \times 3\frac{1}{2} = 14$

(a) Bulk Modulus

(b) Coplanar Concurrent Forces

(c) Orifice Meter

(d) Mouthpiece

(e) Darcy-Weisbach Equation