KERALA AGRICULTURAL UNIVERSITY

B.Tech.(Agri. Engg) 2017 Admission

II Semester Final Examination-July 2018

Iden.1202 Fluid Mechanics and Open Channel Hydraulics (2+1)

Marks: 50

Time: 2 hours

I A Fill in the blanks. (10x1=10)

1 Specific volume is the reciprocal of .....

2 The pressure, in meters of oil (specific gravity 0.8), equivalent to 80 m of water is .....

3 In steady flow, path-lines and stream lines are .....

4 A flow in a pipe will be Laminar if the Renold's number is less than .....

5 The expression for a derived quantity in terms of primary quantities is called the .....of the physical quantity.

B State True/False

6 The point of application of the force of buoyancy on the body is known as Metacentre.

7 The grid obtained by drawing a series of streamlines and equipotential lines is known as a flow net.

8 The Bernoulli's equation states that in a steady, irrotational flow of an incompressible fluid, the total energy at any point is constant.

9 The loss of energy or head caused by friction is called minor losses.

10 The hydraulic jump is defined as the gradual and turbulent passage of water from a subcritical state to supercritical state.

II Write Short notes on any FIVE of the following (5x2=10)

1 Ideal fluid

2 Buoyancy

3 Rotational flow

4 Stream lines

5 Darcy's equation

6 Chezy's formula

7 Similitude

P.T.O

III **Answer any FIVE of the following.** **(5x4=20)**

1 Prove that the pressure is the same in all directions at a point in a static fluid.

2 Derive an expression for the depth of centre of pressure from the free surface of liquid of an inclined plane.

3 Define and distinguish between

(a) steady and unsteady flow (b) rotational and irrotational flow

4 Various co-efficients for an orifice.

5 A pipeline 0.225 m in diameter and 1580 m long has a slope of 1 in 200 for the first 790 m and 1 in 100 for the next 790 m. The pressure at the upper end of the pipeline is 107.91 kPa and at the lower end is 53.955 kPa. Taking $f = 0.032$, determine the discharge through the pipe.

6 Buckingham π-method of dimensional analysis with an example.

7 Energy variation in a short hydraulic jump using the specific energy equation.

IV **Answer any ONE of the following** **(1x10=10)**

1 State and derive Bernoulli's theorem, mentioning clearly the assumptions underlying it.

2 State the conditions under which the rectangular section of an open channel will be most economical. Derive these conditions.

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