Total No. of printed pages = 7

RETEST EXAMINATION - 2019

Semester : 4th

Subject Code : CT-403

FLUID MECHANICS

Full Marks – 70

Time – Three hours

The figures in the margin indicate full marks for the questions.

Instructions :

1. *All* questions of PART – A are compulsory.
2. Answer any *five* questions from PART – B.

PART – A

Marks – 25

1. Fill in the blanks : 1×10=10

   (a) Mass density of water is ———.

   (b) Example of dilatant fluid is ———.

   (c) Example of manometric liquid is ———.

[Turn over

(d) Venturimeter is used for measuring ——— of flowing fluid.

(e) Pitot tube is used for measuring ——— at any point in a channel.

(f) Continuity equation is based on principle of ———.

(g) Point of application of total pressure is called ———.

(h) 1 Stokes is equal to ——— m^2/s.

(i) According to Newton's 2nd law of motion, Force is equal to ———.

(j) If depth of flow is remained constant throughout the length of channel, then flow is said to be ———.

2. Write true or false : 1×10=10

(a) A non-prismatic channel is carrying discharge with constant velocity.

(b) Stream line is not an imaginary curve drawn through flowing fluid.

(c) Fluid kinematics deal with describing the motion of fluid with considering the forces.

(d) Velocity is vector quantity.

(e) Differential manometer is used for measuring velocity.

(f) There is no shearing action, while fluid is at rest.

(g) Pressure goes on decreasing with increasing height.

(h) Mass per unit weight is called mass density.

(i) Local acceleration depends upon time.

(j) Poise is the unit of dynamic viscosity.

3. Choose the correct answer : 1×5=5

(a) Relative density of water is

(i) 0 (ii) 1

(iii) 2 (iv) 3

(b) For steady uniform flow, total acceleration is

(i) 0 (ii) 1

(iii) 2 (iv) 3

(c) Notch is used for measuring

(i) pressure

(ii) velocity

(iii) discharge

(iv) None of the above

(d) In turbulent flow, fluid particle move in

(i) disorderly manner

(ii) layers

(iii) zigzag

(iv) None of the above

(e) Reynolds number is the ratio of inertia force to

(i) gravity force

(ii) viscous force

(iii) elastic force

(iv) None of the above

PART – B

Marks – 45

4. (a) What do you mean by pressure head ? 2

(b) Write down the Pascal law. 2

(c) Find the depth of a point below water surface in a sea where pressure intensity is 1.006 MN/m^2 and specific gravity of sea water is 1.025. 5

5. (a) What do you mean by fluid dynamics ? 2

(b) Write short note on stream tube. 3

(c) Water is flowing through a taper pipe of length 100 m having diameter 600 mm at the upper end and 300 mm at the lower end at the rate of 50 litres/s. The pipe has a slope of 1 in 30. Find the pressure at the lower end if the pressure at the higher level is 19.62 N/cm^2. 4

6. (a) Based on Reynolds number classify the type of flow. 2

(b) The rate of flow of water through a horizontal pipe is 0.25 m3/s. The diameter of the pipe which is 200 mm is suddenly enlarged to 400 mm. The pressure intensity in the smaller pipe is 11.72 N/cm2. Determine

(i) loss of head due to sudden enlargement, and

(ii) pressure intensity in the large pipe. 7

7. (a) What do you mean by coefficient of discharge ? 2

(b) An orifice meter with orifice diameter 15 cm is inserted in a pipe of 30 cm diameter. The pressure difference measured by a mercury-oil differential manometer on the two sides of orifice meter gives a reading of 50 cm of mercury. Find the rate of flow of oil of specific gravity 0.9, when coefficient of discharge of the orifice meter is 0.64. 7

8. (a) What do you mean by unsteady flow ? 2

(b) Find the velocity of flow and rate of flow of water through a rectangular channel of 6 m wide and 3 m deep, when it is running full. The channel has bed slope as 1 in 2000. Take Chezy's constant (C) = 55. 7

9. A horizontal venturimeter with inlet diameter 20 cm and throat diameter 10 cm is used to measure the flow of water. The pressure at inlet is 17.658 N/cm^2 and the vacuum pressure at the throat is 30cm of mercury. Find the discharge of water through venturimeter. Take $C_d = 0.98$. 9