

**MAHARASHTRA ANIMAL AND FISHERY SCIENCES UNIVERSITY, NAGPUR**  
**SEMESTER END THEORY EXAMINATION, B.Tech. (D.T.) Degree Course 2016-17**

Semester	: I (V Dean)	Academic Year	: 2016-2017
Course No.	: DE-102	Course Title	: Fluid Mechanics
Credits	: 2+1=3	Total Marks	: 50
Day & Date	: Monday, 02/01/2017	Time	: 11.00 to 13.00 Hrs.

- Note :
- 1) All questions carry equal marks.
  - 2) Section "A" is Compulsory.
  - 3) Solve **Any three** questions from Section "B"
  - 4) The use of scientific tables, charts and calculator is allowed in case of engineering courses.

**SECTION - 'A'**

- Q. 1 A) State the dimensions (L, M, T) for following. (05)
- i) Force
  - ii) Discharge
  - iii) Absolute pressure
  - iv) Kinematic viscosity
  - v) Liquid head
- B) Write short note for the following. (05)
- i) Micro manometer
  - ii) Continuity equation
  - iii) Variable area flow meter
  - iv) Notches
  - v) Capillarity of water
- Q. 2 A) State whether True or False. If false, rewrite the statement after making necessary corrections. (05)
- i) The coefficient of discharge for a mouthpiece is more than that for an orifice.
  - ii) Venturi meter is used to measure velocity at a point.
  - iii) A Pump is defined as a device which converts mechanical energy into hydraulic energy.
  - iv) The term  $V^2/2g$  is known as pressure energy.
  - v) When the fluid is at rest, the shear stress is maximum.
- B) Choose the most appropriate answer from the options given below. (05)
- i) Dynamic viscosity has a dimensions as .....
    - a)  $MLT^{-2}$
    - b)  $ML^{-1}T^{-1}$
    - c)  $ML^{-1}T^{-2}$
    - d)  $M^{-1}L^{-1}T^{-1}$
  - ii) Poise is the unit of .....
    - a) Mass density
    - b) Kinematic viscosity
    - c) Viscosity
    - d) Velocity gradient
  - iii) Atmospheric pressure in terms of water column is .....
    - a) 7.5m
    - b) 8.5m
    - c) 9.81m
    - d) 10.30m

**(P.T.O.)**

- iv) Continuity equation for a compressible liquid can take the form .....
- |                                 |                                  |
|---------------------------------|----------------------------------|
| a) $A_1V_1 = A_2V_2$            | b) $\rho_1A_1 = \rho_2A_2$       |
| c) $\rho A_1V_1 = \rho_2A_2V_2$ | d) $\rho_1A_1V_1 = \rho_2A_2V_2$ |
- v) Pitot tube is used for measurement of .....
- |                        |              |
|------------------------|--------------|
| a) Pressure            | b) Flow      |
| c) Velocity at a point | d) Discharge |

### SECTION – 'B'

- Q. 3 A) With neat diagram explain construction and working of positive displacement pump. (05)  
 B) A reciprocating pump lifts 100 lit/min of water from the depth of 9 meters and discharges it to the tank located 10 meters above the pump. Estimate the Manometric head and Power requirement. (05)
- Q. 4 A) Explain the applications of Bernoulli's equation. (05)  
 B) State the Archimedes's principle of buoyancy. Give the conditions of equilibrium of a floating body. (05)
- Q. 5 A) Explain in brief the equation for continuity of fluid flow. (03)  
 B) Explain the term cavitation and state the measures to prevent it. (03)  
 C) Write short note on U-tube monometer. (04)
- Q. 6 A) Explain any six properties of fluid. (03)  
 B) With neat sketch explain the venturimeter. (03)  
 C) Milk is flowing through a pipe of 2.5 cm diameter at the rate of 2000 kg/h. Given density of fluid as 1032 kg/m<sup>3</sup> viscosity is 658 x 10<sup>-6</sup> Pa. Calculate Reynolds and indicate the type of flow? (04)
- Q. 7 Explain the loss of head due to contraction and expansion of the pipe section and friction of fluid with inner wall of pipe with relevant equations. (10)

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