

# Unit 2 - Week 1 : INTRODUCTION

## Course outline

### How to access the portal

#### Week 1 : INTRODUCTION

- Basic Concepts of Fluid
- Properties of Fluid
- Fluid Flow Analysis
- Quiz : Assignment 1
- Feedback form

#### Week 2 : FLUID STATICS

#### Week 3 : FLUID DYNAMICS

#### Week 4 : FLUID DYNAMICS

#### Week 5 : APPLICATIONS OF FLUID STATICS AND DYNAMICS

#### Week 6 : FLUID KINEMATICS

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#### Week 8 : INCOMPRESSIBLE VISCOUS FLOW IN PIPES

#### Live Session

## Assignment 1

The due date for submitting this assignment has passed.  
As per our records you have not submitted this assignment.

**Due on 2019-09-11, 23:59 IST.**

1) In a Newtonian fluids, for a given shear stress, the rate at which fluid deforms is 1 point

- a. Independent of kinematic viscosity
- b. Directly proportional to the dynamic viscosity
- c. Inversely proportional to the dynamic viscosity
- d. None of the above

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
c. *Inversely proportional to the dynamic viscosity*

2) A control volume implies 1 point

- a. An isolated system
- b. A fixed region in space
- c. A closed system
- d. A specified mass in fluid flow

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
b. *A fixed region in space*

3) Match List 1 and List 2 and select the correct answer using the codes given below 1 point

- List 1
- P. Property which explains the spherical nature of a drop of a fluid
  - Q. Property which explains cavitation in fluid flow
  - R. Property which explains rise of water in trees
  - S. Property which explains flow of oil jet

- List 2
1. Viscosity
  2. Surface tension
  3. Compressibility
  4. Vapor pressure
  5. Capillarity

- a. P-3, Q-4, R-5, S-1
- b. P-1, Q-2, R-3, S-4
- c. P-2, Q-4, R-5, S-1
- d. P-1; Q-2; R-4, S-5

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
c. *P-2, Q-4, R-5, S-1*

4) The unit of dynamic viscosity of a fluid is 1 point

- a.  $m^2/s$
- b.  $N-s/m^2$
- c.  $Pa-s/m^2$
- d.  $Kg-s^2/m^2$

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
b.  *$N-s/m^2$*

5) With increase of temperature, viscosity of a fluid 1 point

- a. Does not change
- b. Always increase
- c. Always decrease
- d. Increase, if the fluid is a gas and decrease, if it is a liquid

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
d. *Increase, if the fluid is a gas and decrease, if it is a liquid*

6) Continuum approach in fluid mechanics is valid when 1 point

- a. The compressibility is very high
- b. The viscosity is low
- c. The mean free path of the molecule is much smaller compared to the characteristic dimension
- d.  $M \gg 1$ , where M is Mach number

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
c. *The mean free path of the molecule is much smaller compared to the characteristic dimension*

7) Shear stress in the Newtonian fluid is proportional to 1 point

- a. Pressure
- b. Strain
- c. Strain rate
- d. The inverse of viscosity

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
c. *Strain rate*

8) Surface tension has the units of 1 point

- a. Force per unit length
- b. Force per unit area
- c. Force per unit volume
- d. Cannot say

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
a. *Force per unit length*

9) The path traced by single fluid particle is 1 point

- a. Stream line
- b. Streak line
- c. Path line
- d. None of the above

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
c. *Path line*

10) The flow in which velocity of a fluid at a particular fixed point does not change with time 1 point

- a. Unsteady flow
- b. Oscillatory flow
- c. Steady flow
- d. Periodic flow

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
c. *Steady flow*

11) A fluid is one which can be defined as a substance 1 point

- a. Has same shear stress at all points
- b. Can deform indefinitely under the action of the smallest shear force
- c. Has the small shear stress in all directions
- d. Is practically incompressible

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
b. *Can deform indefinitely under the action of the smallest shear force*

12) Kinematic viscosity is defined as 1 point

- a. Dynamic viscosity x density
- b. Dynamic viscosity/density
- c. Dynamic viscosity x pressure
- d. Pressure x density

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
b. *Dynamic viscosity/density*

13) Poise is the unit of 1 point

- a. Mass density
- b. Kinematic viscosity
- c. Viscosity
- d. Velocity gradient

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
c. *Viscosity*

14) A Newtonian fluid is defined as the fluid which 1 point

- a. Is incompressible and non-viscous
- b. Obeys Newton's law of viscosity
- c. Is highly viscous
- d. Is compressible and non-viscous

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
b. *Obeys Newton's law of viscosity*

15) Two horizontal plates are placed 14 mm apart and the space between them is filled with an oil of viscosity 1.4 N-s/m<sup>2</sup>. If the upper plate moves with 2.5 m/s, the shear stress in the oil is.....

**Hint**

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
(Type: Numeric) *250*

**2 points**

16) A liquid of  $\rho$  density and dynamic viscosity  $\mu$  flows steadily down an inclined plane in a thin sheet of constant thickness  $t$ . The shear stress on the bottom surface due to the liquid flow is (where  $\theta$  is the angle, the plane makes with horizontal).....

**Hint**

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
(Type: String)  *$\mu g t \sin \theta$*

**0 points**

17) Calculate specific weight of one litre of a liquid which weighs 7N.....

**Hint**

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
(Type: Numeric) *7000*

**1 point**

18) For above question calculate specific gravity

**Hint**

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
(Type: Range) *0.69,0.72*

**1 point**