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AN AUTONOMOUS INSTITUTION

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23MEB201-FLUID MECHANICS AND MACHINERY

Puzzle Questions

Multiple-choice Questions on Fluid Mechanics

1. The dimension of coefficient of viscosity is
    a. $M^1L^{-1}T^{-1}$
    b. $M^{-1}L^1T^{-1}$
    c. $M^{-1}L^1T^1$
    d. $M^{-1}L^{-1}T^1$

Answer (a)

2. Surface tension _____
    a. Acts in the plane of the interface normal to any line in the surface
    b. Is also known as capillarity
    c. Is a function of the curvature of the interface
    d. Decreases with fall in temperature

Answer (a)

3. In a static fluid _____
    a. Resistance to shear stress is small
    b. Fluid pressure is small
    c. Linear deformation is small
    d. Only normal stress can exist

Answer (d)

4. Which of the following statements is correct about the shear stress distribution in circular pipes with laminar flow?

    a. It is linear with maximum value at the centre

    b. It is parabolic with maximum value at the centre

    c. It is parabolic with zero value at the centre

    d. It is linear with zero value at the centre

Answer (b)

5. Which of the following are examples of free vortex motion?

i. Motion of air in cyclone

ii. Motion of liquid at the bottom of wash basin

iii. Motion of liquid inside impeller of pump

iv. Motion of eddies in rivers and canals

    a. i., ii., and iv.

    b. i., ii., and iii.

    c. i., iii., and iv.

    d. All of the above

Answer (a)

6. Assertion: The flow of fluid is said to be steady if at any given point, the velocity of each passing fluid particle remains constant.

Reason: The path taken by a fluid particle under a steady flow is a streamline.

    a. Both statements (I) and (II) are individually true, and statement (II) is the correct explanation of statement (I)

    b. Both statements are individually true, but statement (II) is NOT the correct explanation of statement (I)

    c. Statement (I) is true; but statement (II) is false

    d. Statement (I) is false; but statement (II) is true

Answer (b)

7. Assertion: Positive pressure gradient helps in separating the boundary layer.

Reason: At the point of boundary layer separation, the shear stress is zero.

   a. Both statements (I) and (II) are individually true, and statement (II) is the correct explanation of statement (I).

   b. Both statements (I) and (II) are individually true, and statement (II) is NOT the correct explanation of statement (I).

   c. Statement (I) is true; but statement (II) is false

   d. Statement (I) is false; but statement (II) is true

Answer (c)

8. Which of the following statement(s) is/are correct regarding hydraulic turbines?

I. Kaplan turbines are used for low head and high discharge

II. Specific speed of the Kaplan turbine is more than the Francis turbine

III. Runner of Francis turbines has blades much less than Kaplan turbine

IV. Efficiency of the Francis turbine is higher than the Kaplan turbine

   a. I, II only

   b. I, II, IV only

   c. I, III, IV only

   d. II, III only

Answer (a)

9. A pipe of diameter 200 mm carries water in turbulent flow. The velocity of water at the centre of the pipe and 50 mm from the centre of the pipe are 3 m/s and 2 m/s, respectively. What is the shear stress at the wall of the pipe?

   a. 785 N/m^2

   b. 334 N/m^2

   c. 528 N/m^2

   d. 614 N/m^2

Answer (b)

10. The shear stress at a point in oil is 0.230 N/m^2 and velocity gradient at this point is 0.20 s^{-1}. If the density of oil is 1240 kg/m^3, kinematic viscosity of oil would be

    a. 0.93 stokes

    b. 92.7 cm^2/s

    c. 9.3 stokes

    d. 0.093 stokes

Answer (c)

11. Statement (I): Rate of maximum velocity of average velocity of viscous fluid between two parallel plates is 1.5

Statement (II): Ratio of maximum viscosity to average velocity for flow of viscous fluid through a circular pipe is 2.0

    a. Both statements (I) and (II) are individually true, and statement (II) is the correct explanation of statement (I)

    b. Both statements (I) and (II) are individually true, and statement (II) is NOT the correct explanation of statement (I)

    c. Statement (I) is true; but statement (II) is false

    d. Statement (I) is false; but statement (II) is true

Answer (b)

12. A liquid compressed in a cylinder has a volume of 0.04 m^2 at 50 N/cm^2 and a volume of 0.039 m^3 at 150 N/cm^2. The bulk modulus of elasticity of liquid is

    a. 400 N/cm^2

    b. 4000 N/cm^2

    c. 40000 N/m^2

    d. 40 N/cm^2

Answer (b)

13. The pressure at a point in a fluid will not be same in all directions when the fluid is _____

    a. Moving

    b. Viscous

c. Viscous and static

d. Viscous and moving

Answer (d)

14. The velocity distribution for flow over a flat plate is given by $u = (y-y^2)$ in which u is velocity in metres per second at a distance y metres above the plate. What is the shear stress value at y = 0.15 m? The dynamic viscosity of fluid is 8.0 poise.

    a. 12.4 N/m^2

    b. 1.24 N/m^2

    c. 0.56 N/m^2

    d. 5.6 N/m^2

Answer (c)

15. A hydrometer is used to determine

    a. Relative humidity

    b. Surface tension of liquids

    c. Specific gravity of liquids

    d. Viscosity of liquids

Answer (c)

16. When a fluid is in motion, the pressure at a point is the same in all directions. Then the fluid is

    a. Real fluid

    b. Newtonian fluid

    c. Ideal fluid

    d. Non-Newtonian fluid

Answer (c)

17. Specific weight of sea water is more than that of pure water because it contains _____

    a. Dissolved air

    b. Dissolved salt

c. Suspended matter

d. All of the above

Answer (d)

18. A fluid is defined as one which

    a. Cannot withstand shear

    b. Can withstand shear

    c. Deforms continuously when subjected to shear stress

    d. Is solid like when there is no motion

Answer (c)

19. The normal stress in a fluid will be constant in all directions at a point only if

    a. It is incompressible

    b. It has uniform viscosity

    c. It has zero viscosity

    d. It is at rest

Answer (d)

20. The vapour pressure over the concave surface is _____

    a. Less than the vapour pressure over the plane surface

    b. Equal to vapour pressure over the plane surface

    c. Greater than the vapour pressure over the plane

    d. Zero

Answer (a)

21. Dilant is a fluid for which

    a. Dynamic viscosity decreases as the rate of shear increases

    b. Newton’s law of viscosity holds good

    c. Dynamic viscosity increases as the rate of shear increases

d. Dynamic viscosity increases with time for which shearing forces are applied

Answer (c)

22. Match List – I and List – II and select the correct answer using the codes given below the lists

List-I List-II

A. Lubrication 1. Capillary

B. Rise of sap in trees 2. Vapour pressure

C. Formation of droplets 3. Viscosity

D. Cavitation 4. Surface tension

a. A-2; B-4; C-1;D-3

b. A-3; B-4;C-1; D-2

c. A-2; B-1; C-4; D-3

d. A-3; B-1; C-4; D-2

Answer (d)

23. A piece of metal of specific gravity 13.6 is placed in mercury of specific gravity 13.6, what fraction of its volume is under mercury?

a. The metal piece will simply float over the mercury

b. The metal piece will be immersed in mercury by half

c. Whole of the metal piece will be immersed with its top surface just a level over mercury

d. The metal piece will sink to the bottom

Answer (c)

24. If the surface of the liquid is convex, the

a. Cohesion pressure in negligible

b. Cohesion pressure is decreased

c. Cohesion pressure is increased

d. None of the above

Answer (c)

25. The angle of contact in case of liquid depends upon

A. The nature of the liquid and the solid

B. The material which exists above the free surface of the liquid

a. Only A

b. Only B

c. Both A and B

d. Neither A and B

Answer (c)