

## **FMHM OBJECTIVE QUESTIONS (4<sup>TH</sup> SEM MECHANICAL)**

*Prepared by P.Mahapatra*

1. Bernoulli's equation cannot be applied when the flow is
  - (A) Rotational
  - (B) Turbulent
  - (C) Unsteady
  - (D) All of the above.
2. Relative density of mercury is
  - (A) 1
  - (B) 9.8
  - (C) 13.6
  - (D) 1000
3. A Newtonian fluid is defined as the fluid which
  - (A) Obeys Hookes law
  - (B) Is compressible
  - (C) Obeys Newtons law of viscosity
  - (D) Is incompressible
4. If the Reynolds number is less than 2000, the flow in a pipe is
  - (A) Turbulent
  - (B) Laminar
  - (C) Transition
  - (D) None of the above
5. The unit of pressure one bar is
  - (A) 1 pascal
  - (B) 1 kilo pascal
  - (C) 100 kilo pascal
  - (D) 1000 kilo pascal
6. Property of fluid that describes its internal resistance is known as:
  - (A) Viscosity
  - (B) Friction
  - (C) Resistance
  - (D) Internal energy
7. Stress strain relationship for Newtonian fluid is
  - (A) Parabolic
  - (B) Hyperbolic
  - (C) Linear
  - (D) Inverse type

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8. According to Archimede's principle, if a body is immersed partially or fully in a fluid then the buoyancy force is \_\_\_\_\_ the weight of the fluid.

- (A) Equal to
- (B) Less than
- (C) More than
- (D) Unpredictable

9. What is the correct formula for absolute pressure?

- (A)  $P_{abs} = P_{atm} - P_{gauge}$
- (B)  $P_{abs} = P_{vacuum} - P_{atm}$
- (C)  $P_{abs} = P_{vacuum} + P_{atm}$
- (D)  $P_{abs} = P_{atm} + P_{gauge}$

10. Bulk modulus is the ratio of

- (A) shear stress to volumetric strain
- (B) volumetric strain to shear stress
- (C) compressive stress to volumetric strain
- (D) volumetric strain to compressive stress

11. Which of the following equations is dimensionally homogeneous? Consider standard symbols for quantities.

- (A) (Force)  $F = m \times a$
- (B) (Head Loss due to friction)  $h_f = (f L V^2) / (2 g d)$
- (C) (Torque)  $T = F \times \text{Distance}$
- (D) None of the above

12. Friction factor for laminar flow is given by

- (A)  $(Re / 64)$
- (B)  $(64 / Re)$
- (C)  $(Re / 16)$
- (D)  $(16 / Re)$

13. Viscous forces are not present in

- (A) Rotational flow
- (B) Irrotational flow
- (C) Laminar flow
- (D) None of the above

14. The fluid will rise in capillary when the capillary is placed in fluid, if

- (A) the adhesion force between molecules of fluid and tube is less than the cohesion between liquid molecules
- (B) the adhesion force between molecules of fluid and tube is more than the cohesion between liquid molecules

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(C) the adhesion force between molecules of fluid and tube is equal to the cohesion between liquid molecules  
(D) cannot say

15. What is an ideal fluid?

(A) A fluid which has no viscosity  
(B) A fluid which is incompressible  
(C) A fluid which has no surface tension  
(D) All of the above

16. Newton's law of viscosity states that

(A) the shear stress applied to the fluid is directly proportional to the velocity gradient ( $du/dy$ )  
(B) the shear stress applied to the fluid is inversely proportional to the velocity gradient ( $du/dy$ )  
(C) the shear stress applied to the fluid is directly proportional to the specific weight of the fluid  
(D) the shear stress applied to the fluid is inversely proportional to the specific weight of the fluid

17. If viscosity of fluid is more, the thickness of boundary layer is

(A) More  
(B) Less  
(C) Not affected  
(D) Unpredicted

18. What is the correct formula for loss at the exit of a pipe?

(A)  $h_L = 0.5 (V^2 / 2g)$   
(B)  $h_L = (V^2 / 2g)$   
(C)  $h_L = (2 V^2 / g)$   
(D)  $h_L = (4 V^2 / g)$

19. Minor losses occur due to

(A) sudden enlargement in pipe  
(B) sudden contraction in pipe  
(C) bends in pipe  
(D) all of the above

20. The study of force which produces motion in a fluid is called as

(A) Fluid statics  
(B) Fluid dynamics  
(C) Fluid kinematics  
(D) None of the above

21. Which of the following is the correct relation between centroid (G) and the centre of pressure (P) of a plane submerged in a liquid?

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- (A) G is always below P
- (B) P is always below G
- (C) G is either at P or below it.
- (D) P is either at G or below it.

22. In the inverted U-tube Differential manometer, how is the specific gravity of manometric fluid used relative to the fluid flowing in the pipes

- (A) Specific gravity is more than that of fluid flowing in pipes
- (B) Specific gravity is less than that of fluid flowing in pipes
- (C) Specific gravity is equal to that of fluid flowing in pipes
- (D) None of the mentioned

23. Which device is popularly used for measuring difference of low pressure?

- (A) Inverted U-tube Differential Manometer
- (B) U-tube Differential Manometer
- (C) Inclined Single column manometer
- (D) Vertical Single column manometer

24. The right limb of a simple U-tube manometer containing mercury is open to the atmosphere while the lift limb is connected to a pipe in which a fluid of specific gravity 0.85 is flowing. The centre of the pipe is 14 cm below the level of mercury in the right limb. Evaluate the pressure of fluid flowing in the pipe if the difference of mercury level in the two limbs is 22 cm.

- (A) 2.86 N/cm<sup>2</sup>
- (B) 5.73 N/cm<sup>2</sup>
- (C) 1.43 N/cm<sup>2</sup>
- (D) None of the mentioned

25. A Differential manometer is connected at the points A and B at the centre of two pipes. The pipe A(left limb) contains a liquid of specific gravity = 1.5 while pipe B (right limb)contains a liquid of specific gravity 0.85. The pressure at A and B are .5 kgf/cm<sup>2</sup> and 1.2 kgf/cm<sup>2</sup> respectively. Find the difference in level of mercury in the differential manometer. A is 2.5m above B and 5 m above the mercury in its own limb. B is 2.5 m above the mercury level in limb A.

- (A) 12.7 cm
- (B) 25.5 cm
- (C) 6.28 cm
- (D) 10.85 cm

26. The continuity equation is based on the principle of

- (A) Conservation of mass
- (B) Conservation of momentum
- (C) Conservation of energy

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(D) Conservation of force

27. Find the discharge of water flowing over a rectangular notch of 1.5 m length when the constant head over the notch is 275 mm. Take  $C_d = .60$

(A) 400 lit/s  
(B) 465 lit/s  
(C) 385 lit/s  
(D) 575 lit/s

28. The results of which are more accurate

(A) Rectangular notch  
(B) Triangular weir  
(C) Both are same  
(D) Rectangular weir

29. Does total pressure takes into the account force exerted by the fluid when it is in the dynamic motion?

(A) Yes  
(B) No  
(C) Depends on conditions  
(D) Depends on type of motion

30. Can centre of pressure for a vertical plane submerged surface be ever be above centre of Gravity

(A) Yes  
(B) No  
(C) It can be above in cases where the surface height is very large  
(D) None of the mentioned

31. In a stationery vertical plate, the jet after striking the plate will move \_\_\_\_\_

(A) In opposite direction  
(B) Along the plate  
(C) Perpendicular to the plate  
(D) Parallel to the plate

32. At what angle does the jet deflect after striking a stationery vertical plate?

(A) 30  
(B) 60  
(C) 90  
(D) 0

33. The velocity component after striking the surface will be \_\_\_\_\_

(A) One  
(B) Zero

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(C) Infinity  
(D) Negative

34. Which among the following is the formula for Force when it strikes the plate?  
(A)  $pav^2$   
(B)  $pav$   
(C)  $pa$   
(D)  $maE$

35. Which among the following is formula for force when it acts along the direction of flow?  
(A)  $pav^2 \sin^2 \theta$   
(B)  $pav \sin^2 \theta$   
(C)  $pa \sin^2 \theta$   
(D)  $maE \sin^2 \theta$

36. A jet strikes a curved plate at its \_\_\_\_\_  
(A) Sides  
(B) Surface  
(C) Center  
(D) Does not strike

37. A jet after striking a smooth plate comes out with a \_\_\_\_\_ velocity.  
(A) Increased  
(B) Decreased  
(C) Same  
(D) Zero

38. Which of the following cannot be the value of absolute pressure of a fluid at any point?  
(A) 0  
(B) 1.013 bar  
(C) -1 bar  
(D) 200 bar

39. A manometric liquid should suitably have \_\_\_\_\_  
(A) Low density & Low Vapour pressure  
(B) Low density & High Vapour pressure  
(C) High density & Low Vapour pressure  
(D) High density & High Vapour pressure

40. The specific gravity of a liquid has  
(A) the same unit as that of mass density  
(B) the same unit as that of weight density  
(C) the same unit as that of specific volume

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(D) no units

41. The specific volume of a liquid is the reciprocal of  
(A) Weight density  
(B) Mass density  
(C) Specific weight  
(D) Specific volume

42. Specific gravity is what kind of property?  
(A) Intensive  
(B) Extensive  
(C) None of above  
(D) Depends on external conditions

43. Which of the following contribute to the reason behind the origin of surface tension?  
(A) Only cohesive force  
(B) Only adhesive force  
(C) neither cohesive forces nor adhesive forces  
(D) both cohesive forces and adhesive forces

44. A uniform body of size 4 m long \* 2.5 m wide \* 1.5 m deep floats in water. What is the weight of the body if depth of immersion is 1 m ?  
(A) 147.1 KN  
(B) 294.3 KN  
(C) 73.5 KN  
(D) 588.6 KN

45. Proper explanation for metacentre is:  
(A) Point at which line of action of force meets the normal axis of body when it is given angular displacement  
(B) Intersection of line passing through new centre of buoyancy and centre of gravity.  
(C) point about which body starts oscillating when it is given small angular displacement  
(D) all of the above

46. Hydraulic gradient line takes into consideration  
(A) potential and kinetic heads only  
(B) potential and pressure heads only  
(C) kinetic and pressure heads only  
(D) potential, kinetic and pressure heads

47. The vertical intercept between TEL and HGL is equal to  
(A) Pressure head  
(B) Potential head

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- (C) Kinetic head
- (D) Piezometric head

48. A point in a fluid flow where the flow has come to rest is called \_\_\_\_\_

- (A) Pressure point
- (B) Initial point
- (C) Flow point
- (D) Stagnation point

49. A one dimensional flow is also called as \_\_\_\_\_

- (A) Steady flow
- (B) Uniform flow
- (C) Zig-zag flow
- (D) A flow which involves zero transverse component

50. At what temperature is the density of water the maximum?

- (A) 100° C
- (B) 0° C
- (C) 5° C
- (D) 0 K