Department of Mechanical Engineering

CE8403 APPLIED HYDRAULIC ENGINEERING

Unit III - RAPIDLY VARIED FLOW MCQ Bank

1. What is the physical principle behind momentum equation?
   a) Newton's second law of motion
   b) Newton's first law of motion
   c) Zeroth law of thermodynamics
   d) First law of thermodynamics
   Answer: a

2. Which of these statements hold true?
   a) Momentum conservation is applicable to neither individual directions nor the whole system
   b) Momentum conservation is applicable to the whole system but not individually
   c) Momentum conservation is applicable to both individual directions and the whole system
   d) Momentum conservation is applicable only to the three directions individually
   Answer: c

3. Consider an element shown below. S is the source term
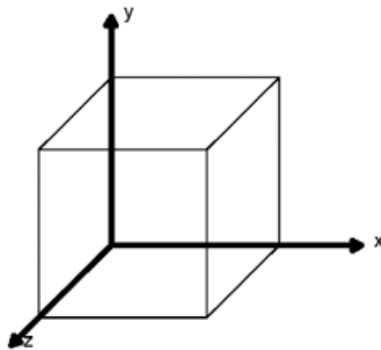
If gravitational force is the only force acting on this element. Which of these following is correct?
   a) Sx=mg, Sy=0, Sz=mg
   b) Sx=0, Sy=0, Sz=mg
   c) Sy=0, Sz=0, Sx=mg
   d) Sz=0, Sx=0, Sy=mg
   Answer: d

4. The physical property Φ of the general transport equation is replaced by _____ to get momentum equation.
   a) Velocity vector
   b) Mass
   c) Force vector
   d) Acceleration vector
   Answer: a

5. The source term in the momentum equation is _____

   a) Pressure force
   b) Body forces
   c) Viscous force
   d) Acceleration
      Answer: b

6. Which among these forces used in momentum equation is a tensor?
   a) Gravitational forces
   b) Pressure forces
   c) Viscous forces
   d) Electromagnetic forces
   Answer: c

7. What do the two subscripts of stress tensors represent?
   a) Directions of stress and strain
   b) Directions of stress and normal to the surface on which they are acting
   c) Directions of strain and normal to the surface on which they are acting
   d) Direction of stress and the flow direction
   Answer: b

8. The divergence of the stress tensor is _____
   a) Scalar
   b) Vector
   c) 0
   d) 1
   Answer: b

9. What are the two viscosity coefficients involved in the relationship between stress tensor and strain rate of fluids?
   a) Kinematic viscosity and bulk viscosity
   b) Dynamic viscosity and kinematic viscosity
   c) Dynamic viscosity and bulk viscosity
   d) Kinematic viscosity and volume viscosity
   Answer: c

10. Viscous forces fall into which kind of the following forces acting on a body?
    a) Pressure force
    b) Tensile force
    c) Body forces
    d) Surface forces
    Answer: c
11. Hydraulic jump is observed in _____
    a) Closed channel flow
    b) Open channel flow
    c) Flow changes
    d) Volumetric changes
    Answer: b
12. Hydraulic jump depends upon
    a) Temperature
    b) Pressure
    c) Initial fluid speed
    d) Volumetric changes
    Answer: c
13. In which case is the hydraulic jump not possible?
    a) Initial speed > critical speed
    b) Initial speed < critical speed
    c) Initial speed = critical speed
    d) Independent
    Answer: b
14. Open channel flow takes place _____
    a) On a free surface
    b) In the pipe
    c) Within a cylindrical depth
    d) In a pump
    Answer: a
15. When the hydraulic jump is in a moving form it is called _____
    a) Negative surge
    b) Positive surge
    c) Turbulent surge
    d) Accelerated surge
    Answer: b
16. Fluid speed before the hydraulic jump is _____
    a) Critical
    b) Supercritical
    c) Subcritical

d) Dynamic

Answer: b

17. Fluid height before the hydraulic jump is _____

    a) Normal

    b) Low

    c) High

    d) Zero

    Answer: b

18. Fluid height after the hydraulic jump is _____

    a) Normal

    b) Low

    c) High

    d) Zero

    Answer: c

19. Fluid flow before the hydraulic jump is _____

    a) Normal

    b) Rough

    c) Smooth

    d) Zero

    Answer: c

20. Fluid flow after the hydraulic jump is _____

    a) Normal

    b) Rough

    c) Smooth

    d) Zero

    Answer: b

21. During a subcritical flow, what is the value of Froude's number?

    a) Zero

    b) Greater than one

    c) Less than one

    d) Not defined

    Answer: C

22. Which hydraulic jump occurs in our sink?

    a) Inertial forces hydraulic jump

    b) Shallow fluid hydraulic jump

    c) Critical depth jump

    d) Hydraulic radius expands

    Answer: b

23. When a shallow water flowing radially slows down due to_____
   a) Friction
   b) Temperature
   c) Pressure
   d) Volume
   Answer: a

24. . Changes in the behaviour of the jump can be observed by changing the _____
   a) Temperature
   b) Pressure
   c) Flow rate
   d) Volumetric changes
   Answer: c

25. Which hydraulic jump is used in abysmal fan formation?
   a) Shallow fluid
   b) Internal wave
   c) External wave
   d) Atmospheric
   Answer: b

26. Which among the following is a parameter that does not account for a change of Internal hydraulic jump?
   a) Temperature
   b) Salinity
   c) Density
   d) Depth
   Answer: d

27. When the hydraulic jump is in a moving form it is called _____
   a) Negative surge
   b) Positive surge
   c) Turbulent surge
   d) Accelerated surge
   Answer: b

28 . Where is hydraulic jump used in industrial applications?
   a) Spillways
   b) Pipes
   c) Pumps
   d) Filters

   Answer: a

29. When a shallow water flowing radially slows down due to _____
   a) Friction
   b) Temperature
   c) Pressure
   d) Volume

   Answer: a