

CHAPTER 03

1. Write Newton's second law of motion.

YOUR ANSWER: $F = ma$

2. The lines that are tangent to the velocity vectors throughout the flow field are called steady flow lines. True or False

A. True

B. False

3. Streamwise acceleration is the product of the rate of change of speed with distance along the streamline, $\partial V / \partial s$, and what else?

A. the speed

B. the pressure

C. the viscosity

4. Raindrops with a radius less than 0.5 mm are what shape?

A. teardrop

B. spherical

C. ring shaped

5. In the derivation of the Bernoulli equation what is assumed to be negligible?

A. pressure effects

B. streamlines

C. viscous effects

6. A garden hose nozzle is designed to have a much higher velocity at the entrance of the nozzle as opposed to the exit. True or False

A. True

B. False

7. An airfoil is designed so that the fluid velocity over its upper surface is _____ than that along its lower surface.

YOUR ANSWER: greater

8.To apply $F = ma$ normal to the streamlines, the normal components of force are needed.

True or False

A. True

B. False

9.The pressure outside a tornado is what compared to the pressure near the center of the tornado?

A. greater than

B. less than

C. equal to

10.When using Newton's second law applied across streamlines and the Bernoulli equation it is important to be sure _____.

A. that the pressure gradients do not change

B. that all of the assumptions are not violated

C. that the flow will never leave the streamlines

11.The Bernoulli equation was obtained by integration of the equation of motion along the _____ coordinate direction of the streamline.

YOUR ANSWER: natural

12.The Bernoulli equation can be written in terms of heights called what?

A. heads

B. levels

C. elevations

13.What fish is known for its ability to shoot down prey with a water jet from its mouth?

A. parrotfish

B. archerfish

C. pistolfish

14.When a fluid particle travels along a curved path, a net force directed toward the center of the curvature is required. True or False

A. True

B. False

15. When measuring the static pressure, one way to do so would be to do what?

- A. Drop a manometer in the middle of the flow of a fluid
- B. check the pressure at the beginning of the flow and compare it to the end
- C. drill a hole along the flat surface and attach a piezometer tube**

16. The velocity at a stagnation point will be greater than the velocity at surrounding areas.
True or False

- A. True
- B. False**

17. If elevation effects are neglected, the stagnation pressure is _____.

- A. the largest pressure obtainable along a given streamline**
- B. the smallest pressure obtainable along a given streamline
- C. always equal to zero

18. The total pressure is equal to the sum of the static pressure, dynamic pressure, and?

- A. stagnation pressure
- B. hydrostatic pressure**
- C. atmospheric pressure

19. _____ measure fluid velocity by converting velocity into pressure.

YOUR ANSWER: Pitot-static tubes

20. The exit pressure for an incompressible fluid jet is equal to what?

- A. static pressure
- B. stagnation pressure
- C. surrounding or atmospheric pressure**

21. If the exit is not a smooth, well-contoured nozzle, but rather a flat plate the diameter of the jet will be less than the diameter of the hole; what is this phenomenon called?

YOUR ANSWER: vena contracta

22. If streamlines at an exit plane are curved, the pressure across them is what?

- A. constant
- B. non-constant**
- C. equal to the static pressure

23. The diameter of a fluid jet is often _____ the hole from which it flows?

A. smaller than

B. equal to

C. larger than

24. Kinetic energy change is often accompanied by a change in _____.

YOUR ANSWER: Pressure

25. What term is used when the fluid pressure is reduced to the vapor pressure?

A. Bernoulli effect

B. differential

C. cavitation

26. Flow meters based on the Bernoulli equation, used to measure flowrates in open channels such as flumes and irrigation ditches, include devices like the sluice gate and the sharp-crested weir. True or False

A. True

B. False

27. The hydraulic grade line and what else are graphical forms of the Bernoulli equation?

A. energy line

B. pressure line

C. viscous line

28. The _____ line is a line that represents the total head available to the fluid.

YOUR ANSWER: energy

29. A change in fluid velocity that results in a change in the elevation of the hydraulic grade line is due to:

A. change in force exerted on the fluid

B. change in pressure

C. change in pipe diameter

30. Examples of a source and a sink are a pump and a turbine. True or False

A. True

B. False

31. The incompressibility assumption made in the derivation of the Bernoulli equation can yield considerable error in which of the following cases?

A. when gases are being studied

B. when the fluid is traveling very slow

C. when you are studying in a vacuum

32. The Bernoulli equation can be modified for compressible flows. True or False

A. True

B. False

33. An adiabatic process means that there is no heat transfer and no ____.

A. pressure losses

B. change in velocity

C. friction

34. The ratio of fluid velocity to the speed of sound is referred to as the ____.

YOUR ANSWER: Mach number

35. As a "rule of thumb," a perfect gas may be considered incompressible for which range of Mach numbers?

A. less than 0.7

B. greater than 0.5

C. less than 0.3

36. The Bernoulli equation is not valid for flows that involve pumps or turbines. True or False

A. True

B. False