CHAPTER 08

1. What is most likely to be the main driving force in pipe flow?

A. Gravity

B. A pressure gradient

C. Vacuum

2.What is a general description of the flow rate in laminar flow?

A. Small

B. Large

C. Turbulent

3.If a dye streak injected into a flow almost immediately becomes blurred and spreads across the entire pipe, the flow is said to be _____.

A. Laminar

B. Slow

C. Turbulent

4.What is the appropriate dimensionless parameter to use in comparing flow types?

YOUR ANSWER: The Reynolds Number, Re.

5.What is the Reynolds number?

YOUR ANSWER: The Reynolds number is the ratio of the inertia to viscous effects in the flow.

6.What is another term for the viscous effects that cause a fluid to stick to the wall of a pipe?

A. The no-slip boundary condition

B. Friction

C. The boundary layer

7.The nature of pipe flow is _____.

A. turbulent

B. constant

C. strongly dependent on whether the flow is laminar or turbulent.

8.In the case of fully developed pipe flow, _____.

A. the velocity profile is irregular.

B. the velocity profile is the same at any cross section of the pipe.

C. The flow is accelerating at a constant rate.

9.Steady, fully developed pipe flow experiences no _____.

A. Acceleration

B. Motion

C. Friction

10.For the laminar flow of a Newtonian fluid, the shear stress is proportional to the _____.

A. amount of friction

B. velocity gradient

C. no-slip condition

11.Is Poisuille's law valid for transitional flow?

YOUR ANSWER: No, it is only valid for laminar flow

12.In fully developed pipe flow, the average velocity is _____ of the maximum velocity.

YOUR ANSWER: one half

13.What parameter of the flow is responsible for head loss?

A. the shear stress on the wall

B. the pressure head

C. the Darcy friction factor.

14.What value must the Reynolds number be lower than to be considered laminar for pipe flow?

A. 20,000

B. 500,000

C. 2,100

15.What value must the Reynolds number be higher than to be considered turbulent for pipe flow?

A. 4,000

B. 500,000

C. 2,100

16.Which results in more efficient heat exchange, laminar or turbulent flow?

YOUR ANSWER: Turbulent

17.The pressure drop in a pipe is greater if the flow is _____.

A. laminar

B. turbulent

C. There is no effect on pressure

18.Turbulence intensity is a measure of _____.

A. the size of the fluctuations of various parameters

B. the number of fluctuating parameters

C. the velocity of the turbulent flow

19.Which shear stress is dominant in the viscous sublayer?

A. Turbulent.

B. Laminar.

C. There is no dominant shear stress.

20.Which has a "flatter" velocity profile?

A. Turbulent flow.

B. Laminar flow.

C. They are equal.

21.What new branch of mathematical physics may provide insight into the complex nature of turbulent flow?

YOUR ANSWER: Chaos theory

22.Is the pressure drop in laminar pipe flow dependent on the roughness of the pipe wall?

YOUR ANSWER: No, it is independent for laminar flow

Explanation: The pressure drop is, however, dependent on the roughness of the pipe wall in turbulent flow.

23.Turbulent pipe flow properties depend on the fluid _____ and the _____.

YOUR ANSWER: Density, pipe roughness

24. What chart gives the friction factor in terms of the Reynolds number and relative roughness?

A. Drag profile

B. Flow chart

C. Moody chart

25. What accuracy is generally expected from the Moody chart?

A. 5%

B. 1%

C. 10%

26. The _____ associated with flow through a valve is a common minor loss.

YOUR ANSWER: Head loss

27. A straight pipe causes a greater head loss than a bent pipe.

A. True

B. False

28. What parameter replaces the diameter for non-circular duct calculations?

A. Hydraulic diameter.

B. The Moody factor.

C. No parameter is needed.

29. How many types of problems are there for pipe flow?

YOUR ANSWER: 3

30. How are pipe flow problems categorized?

YOUR ANSWER: They are categorized by what parameters are given, and what is to be calculated.

31. Some pipe flow problems require a trial and error solution technique.

A. True

B. False

32. The three most common devices used to measure the instantaneous flowrate in pipes

are ____, ____, and ____.

A. Potentiometer, orifice meter, nozzle meter.

B. Venturi meter, orifice meter, nozzle meter.

C. Voltmeter, Amp meter, orifice meter.

33.How is an orifice meter constructed?

YOUR ANSWER: By inserting a flat plate with a hole between two flanges of pipe.

34.A nozzle meter results in a more ideal flow than an orifice meter.

A. True

B. False

35.Which of the three meter types is the most accurate?

A. Orifice

B. Nozzle

C. Venturi

36.What is a bellows meter usually used to measure in most households?

A. Water flow

B. Natural gas flow

C. Air flow in a furnace