

Chapter 13 Review Sheet

1. pressure is the result of a force distributed over an area.

2. What is the equation for pressure?

$$\text{pressure} = \frac{\text{Force}}{\text{area}}$$

3. List the SI unit for the following: force, area, pressure

N m^2 Pa * $Pa = N/m^2$

4. Pressure and force are directly proportional, while pressure and area are inversely/indirectly proportional.

5. Water pressure increases as depth increases. This is a direct relationship.

6. At any given depth, describe how pressure is exerted?

equally in all directions

7. What is a fluid?

Substance that assumes the shape of its container

8. What are the two main examples of fluids?

liquids and gases

9. For a fluid that is not moving, what two factors determine the pressure the fluid exerts?

① depth ② type of fluid

10. Air pressure decreases as the altitude increases. This is a inverse/indirect relationship.

11. What pressure does Earth's atmosphere exert?

101 kPa

12. Why aren't we crushed by Earth's atmospheric pressure?

Pressure inside your body balances the air pressure outside

13. Explain how you can crush a can with air pressure.

- Add a small amount of water to a can of water and heat until water boils.
- Increase in temperature increases the pressure.
- Cap the can and cool, the decrease in temp causes low pressure inside the can
- the high pressure outside the can wants to get to low pressure but can't due to lid so it crushes the can.

14. What is stated in Pascal's principle?

A change in pressure at any point in a fluid is transmitted equally and unchanged in all directions throughout the fluid

15. If you had a bottle filled with water, pressure is greatest at the bottom.

16. When you squeeze a bottle filled with water, what happens to the pressure?

pressure is transmitted equally throughout the fluid

17. What is a hydraulic system?

device that uses pressurized fluid acting on pistons of different sizes to change a force

18. Describe the steps of how a hydraulic system works (look below the picture of the truck)

① Apply input force to a small piston. ② The small piston pushes against the fluid sealed in the system. ③ pressure is transmitted through the fluid to the large piston. ④ Pressure exerted is the same, but output pressure is over larger area so output force is larger

19. According to Bernoulli's principle, as the speed of a fluid increases, the pressure within the fluid decreases. This is a inverse / indirect relationship.

20. Why does a piece of paper move up when you blow air over the top of it?

As you blow across top of paper, the speed increases creating low pressure, Below the paper speed is slow with high pressure. Pressure goes high to low so air below pushed paper up.

21. Use Bernoulli's principle to explain how airplanes achieve flight?

Air moves over wing of plane faster than below. This creates low pressure above the wing and high pressure below the wing. The difference in pressure causes an upward force since pressure moves high \rightarrow low.

22. An upward force created due to a pressure difference is known as lift.

23. Using Bernoulli's principle, explain how a spoiler on a race car is able to exert a downward force and increase traction?

Air moves under the spoiler faster than above. This creates low pressure below the spoiler and high pressure above. The difference in pressure causes air to move high above to low below spoiler creating a downward push for traction.

24. Buoyancy is the ability of a fluid to exert an upward force on an object placed in it.

25. Buoyancy results in the apparent loss of weight of an object in a fluid.

26. True or False: Every object in a fluid experiences buoyancy.

27. What is buoyant force?

The upward force exerted by a fluid; acts in direction opposite of gravity

28. What is stated in Archimedes' Principle?

Buoyant force on an object is equal to the weight of the fluid displaced by the object

29. What happens when you submerge an object in a fluid?

It pushes aside, or displaces, a volume of fluid equal to its own volume

30. When will an object sink?

① When object is more dense than the fluid

② When buoyant force is less than the weight

31. When will an object float?

① When the object is less dense than the fluid

② When buoyant force is greater than or equal to the weight

32. When will an object become suspended?

- ① When objects density equals fluids density
- ② When buoyant force exactly equals the weight

33. What are the two forces that act on every object in a fluid?

weight and buoyant force

34. Why do objects float easier in a dense fluid?

The denser a fluid is, the greater the weight displaced which results in greater buoyant force