Chapter 17 and 18

FLUID Dynamics and FLUID STATICS

1. SI unit of pressure is

a) Ohms
b) Joules
c) **Pascal**
d) Watts

2. girl with a mass of 40 kg wears heels with an area of 10 cm^2 in contact with ground, pressure on ground is ……..

a) $4 \times 10^4\ pa$
b) $\mathbf{4 \times 10^5\ pa}$
c) $40 \times 10^5\ pa$
d) $40 \times 10^{-5}\ pa$

$$P = \frac{F}{A} = \frac{mg}{A} = \frac{40 \times 9.8}{10 \times 10^{-4}} = 3.9 \times 10^5\ Pa = 4 \times 10^5\ Pa$$

3. Which one of following statements related to pressure **is not correct** ?

a) Pressure is directly proportional to force
b) Pressure is inversely proportional to area
c) The SI unit for pressure is Pascal
d) Pressure = Force/(Area × Height)

4. Mass per unit volume is called

a) pressure
b) volume
c) **density**
d) weight

5. Water flowing through hose having diameter 1 cm at speed of 1 m/s if water is to emerge at 21 m/s then diameter of nozzle is…

a) 0.2 cm
b) 0.1 cm
c) 0.02 cm
d) 0.01 cm

$$A_1 v_1 = A_2 v_2$$

$$A = \pi \left(\frac{d}{2}\right)^2$$

$$\pi \frac{d_1^2}{4} v_1 = \pi \frac{d_2^2}{4} v_2$$

$$d_1^2 \, v_1 = d_2^2 \, v_2$$

$$d_2^2 = \frac{d_1^2 \, v_1}{v_2} = \frac{1cm \times 1 \, m/s}{21 \, m/s} = \frac{1}{21}$$

$$d_2 = \sqrt{\frac{1}{21}} = 0.2 \, cm$$

6. Normal force acting per unit cross sectional area is called

a) weight
b) **pressure**
c) volume
d) friction

7. Pressure in fluid depends upon

a) depth below surface
b) density of fluid
c) value of g
d) **all of above**

8. As depth increases, pressure in a fluid

a) **increases**
b) decreases
c) remains constant
d) varies

9- A force of 50N acts uniformly to a surface. What the area of the surface if the pressure is 200 Pa

a) 0.35 m^2
b) 0.25 m^2
c) 2.5 m^2
d) 3.5 m^2

$$P = \frac{F}{A}$$

$$A = \frac{F}{P} = \frac{50}{200} = 0.25\ m^2$$

10- A cub of a certain metal has 0.040 m sides and its mass is 0.48 kg .What is the mass density of the cube?

a) 12 m^3/kg
b) 300 m^3/kg
c)7500 kg/ m^3
d)1800 kg/ m^3

11. Which of the following choices is equivalent to the SI unit of pressure, the pascal ?

a) N/m
b) kg/m s^2
c) N/s
d) kgm/s^2

12. Pressure is a measure of

a) the force per unit area that a fluid exerts.
b) the force exerted by a fluid.
c) the force per unit time that a fluid exerts.
d) the energy in a fluid.

13. The density of mercury is 1.36×10^4 kg/m^3 . What is the mass of a $4.00 \times 10^{-4} m^3$ sample of mercury?

a) 6.29 kg

b) 5.44kg

c) 2.94 kg

d) 0 .00294 kg

14. Which one of the following expressions gives the correct relationship between pressure and force?

a) P= F/A

b) P=FA

c) P= F

d) P= A/F

15. According to equation of continuity when water falls its speed increases, while its cross sectional area

a) increases

b) decreases

c) remain same

d) different

16. Simplified equation of continuity is represented as

a) $A_1v_1 = A_2v_2$

b) $A_1v_2 = A_2v_2$

c) $A_1v_1 = A_1v_2$

d) $A_2v_1 = A_1v_1$

17. If every particle of fluid has irregular flow, then flow is said to be

a) laminar flow

b) turbulent flow

c) fluid flow

d) both a and b

18. Water flowing through hose having diameter 1 cm at speed of 1 m/s if water is to emerge at 21 m/s then diameter of nozzle is

a) 0.2 cm
b) 0.1 cm
c) 0.02 cm
d) 0.01 cm

19. Frictional effect between layers of flowing fluid is known as

a) viscosity
b) friction
c) gravity
d) surface tension

20. . Pressure in liquids is defined by formula

a) $p = h/\rho g$
b) $p = \rho/hg$
c) $p = g/\rho h$
d) $P = h\rho g$

21. Atmospheric pressure is measured by

a) Mercury manometer
b) Mercury barometer
c) Mercury galvanometer
d) Mercury Thermometer

22. In Physics, pressure is defined as

a) P = A x F
b) P = A/F
c) P = F/A
d) P = F/d

23 Atmospheric pressure is calculated by the

a) height of water column in barometer
b) <u>height of mercury column in barometer</u>
c) height of lime column in barometer
d) height of oil column in barometer

23. . SI unit for density is

a) g/cm^3
b) kg/cm^3
c) g/m^3
d) <u>kg/m^3</u>

24. Volume of mercury is 0.4 m^3 and mass is 5440 kg, density of mercury is

a) 1360 kg /m^3
b) 136 kg/ m^3
c) <u>13600 kg /m^3</u>
d) 13.6 kg/ m^3

25. fluid moves along length 0.75 m with velocity 2m/s . The force applied is 2 N and the area of the layer of the fluid is l m^2. Calculate its viscosity.

$$\eta = \frac{F/A}{v/y}$$

$$\eta = \frac{2/1}{2/0.75} = \frac{2}{1} x \frac{0.75}{2}$$

$$\eta = 0.75\ N.s/m^2$$

26. Water travels through a 9.6 cm diameter Tire hose with speed of 1.3 m/s. At the end of the hose, the water flows out through a nozzle whose diameter is 2.5 cm. What is the speed of the water coming out of the nozzle

$$v_2 = v_1(A_1/A_2)$$

$$v_2 = v_1\left(\frac{\pi d_1^2/4}{\pi d_2^2/4}\right) = v_1\left(\frac{d_1^2}{d_2^2}\right)$$

$$v_2 = v_1\left(\frac{d_1^2}{d_2^2}\right) = (1.3\ \text{m/s})\left(\frac{9.6\ \text{cm}}{2.5\ \text{cm}}\right)^2 = 19\ \text{m/s}$$