Page 123
Solution 1
Grams per cubic centimtre (g/cm^3).
Solution 2
Density of water =1000kg/m^3.
Solution 3
Relative density of water is 1.
Solution 4
Pressure has unit of Pascal (Pa).
Solution 5
Pressure is measured in newtons per square metre (N/m^2) i.e., pascal (Pa).
Solution 6
(a) False
(b) True
Solution 7
Buoyant force on an object due to a liquid act s in the vertically upward direction.
Solution 8
Upthrust is the other name of buoyant force.
Solution 9
Buoyant force.
Solution 10
The upward force acting on an object immersed in a liquid is called upthrust.
Solution 11
Archimedes' Principle.
Solution 12
The relative density of mercury is 13.6, this means that mercury is 13.6 times as heavy as an equal volume of water.
Solution 13
Pressure is 'thrust per unit area'.
Solution 14
Buoyant force or upthrust.
Solution 15
The tendency of a liquid to exert an upward force on an object placed in it, is called buoyancy.
Solution 16
The buoyant force on a boat is caused by the pressure of water 'pushing up' on the bottom of the boat.
Solution 17
The density of ice is less than that of water, so ice floats in water.
Solution 18

$$\text{Pressure} = \frac{\text{Force}}{\text{Area}}$$

$$\text{Force} = \text{Area} \times \text{pressure}$$

$$= 0.5 \times 500$$

$$= 250\text{N}$$

Solution 19
Since the object floats in the liquid, so the magnitude of the buoyant force exerted by the liquid is equal to the weight of the object.
Hence, buoyant force =200N
Solution 20
Archimedes gave the magnitude of buoyant force acting on a solid object immersed in a liquid
Solution 21

$$\text{Density of gold} = \frac{\text{mass of gold}}{\text{volume of gold}}$$

$$\text{Volume of gold} = \frac{\text{mass of gold}}{\text{density of gold}}$$

$$= \frac{95}{19} = 5\text{cm}^3$$

Solution 22
Volume=$5m^3$
Density= $3000kg/m^3$

Volume=$5m^3$
Density= $3000kg/m^3$

$$\text{Density of cement} = \frac{\text{mass of cement}}{\text{volume of cement}}$$

$$\text{mass of cement} = \text{Density of cement} \times \text{volume of cement}$$

$$= 3000 \times 5 = 15000\text{kg}$$

Solution 23
Mass of the substance = 100g
Volume of the substance =$10cm^3$

Mass of the substance = 100g
Volume of the substance =$10cm^3$

$$\text{Density of substance} = \frac{\text{mass of substance}}{\text{volume of substance}}$$

$$\text{Density} = \frac{100}{10} = 10\text{g/cm}^3$$

Solution 24
Because the weight of the block of wood is less than the weight of an equal volume of water. So when it is completely submerged in water, the upward buoyant force on it is greater than the downward gravitational force on it. Hence, the lock rises to the surface.
Solution 25

The body will float when dipped in a bucket of water as its density is less than that of water.
Solution 26
(a) pressure
(b) buoyant
(c) average
(d) all; increases
(e) less; density
(f) weight; area
(g) bigger; smaller
Page 124
Solution 27

(a) The **density** of a substance is defined as mass of the substance per unit volume.

$$\text{Density of substance} = \frac{\text{mass of substance}}{\text{volume of substance}}$$

SI unit of density is kg/m^3.

The **relative density** of a substance is the ratio of its density to that of water.

$$\text{Relative Density of substance} = \frac{\text{Density of substance}}{\text{Density of water}}$$

It has no units.

(b)

$$\text{Relative Density of substance} = \frac{\text{Density of substance}}{\text{Density of water}}$$

$$7.1 = \frac{\text{Density of substance}}{1000 kg/m^3}$$

$$\text{density of substance} = 7.1 \times 10^3 kg/m^3$$

Solution 28
The force acting on a body perpendicular to its surface is called thrust. The SI unit of thrust is newton (N).
Solution 29
A mug full of water appears light as long as it is under water because buoyant force acts on it which reduces its effective weight and makes it appear lighter.
Solution 30
As more and more volume of the solid object is immersed in the liquid, the upward 'buoyant force' also keeps on increasing. When the object is completely immersed in the liquid, the buoyant force acting on the solid becomes maximum and remains constant thereafter.
Solution 31
As more and more volume of our body is immersed in water, the apparent weight of the body goes on decreasing and the body seems to become lighter. This is due to the increase in upward buoyant force acting on the body.
Solution 32
Big boulders weig much less while in water and as such are easily moved by the flood.
Solution 33
An iron nail sinks in water but it floats in mercury because density of iron is more than that of water but less than that of mercury.
Solution 34
A piece of glass sinks in water but it floats in mercury because density of glass is more than that of water but less than that of mercury.
Solution 35
A piece of steel sinks in water because steel is denser than water. However, a steel ship is a hollow object made of steel and contains a lot of air in it. Due to presence of a lot of air in it, the average density of the ship becomes less than the density of water. Hence a ship floats in water.
Solution 36
School bags have wide straps so that their weight may spread over

a large area of shoulder producing less pressure on the shoulder.
Solution 37
A sharp knife cuts objects easily because due to its very thin edge, the force of our hand falls on a very small area of the object producing large pressure.
Solution 38
Concrete or wooden
sleepers are kept below the railway line so that the weight of passing train
is spread over a large area of ground and the track may not sink into the
ground.
Solution 39
A wide steel belt is
provided over the wheels of an army tank so that they exert less pressure on
the ground and do not sink into it.
Solution 40
The tip of the sewing needle is sharp so that due to its sharp tip, the needle may put the force on a very small area of the cloth, producing a large pressure sufficient to pierce the cloth being stitched.
Solution 41
When a man is walking, then at one time only one foot is on the ground. Due to this, the force of weight of man falls on a smaller area of the ground and produces more pressure on the ground. On the other hand, when the man is standing, then both his feet are on the ground. Due to this, the weight of the man falls on a larger area of the ground and produces lesser pressure on the ground.
Solution 42
Snow shoes stop us from sinking into soft snow because due to large area of snow shoes, our weight is spread over a large area of the snow producing small pressure.
Solution 43
When a person stands on a cushion then only his two feet (having small area) are in contact with the cushion. Due to this the weight of man falls on a small area of the cushion producing a large pressure causing a big depression in the cushion. On the other hand, when the same person lies down on the cushion, then his whole body (having large area) is in contact with the cushion. Here, his weight falls on a much larger area of the cushion producing much smaller pressure and very little depression in the cushion.
Solution 44
Flat shoes have greater area in contact with the soft sand as compared to heels. Due to this, there is less pressure on soft sand because of which they do not sink much in the sand and it is easy to walk on it.
Solution 45
A nail has a pointed tip, so that when it is hammered, the force of hammer is transferred to a very small area of wood creating a large pressure which pushes the nail into the wood.

********** END **********