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Solution 46

The foundations of buildings and dams are laid on a large area of ground so that the weight of the building or dam produces less pressure on the ground and they may not sink into the ground.

Solution 47

A ship made of iron and steel is a hollow object which contains a lot of air in it. Due to the 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.

On the other hand, a piece of iron is denser than water, so it sinks in water.

Solution 48

Camels have large flat feet so that there is a greater area in contact with the sand which produces less pressure on the sand and the camels can move easily on the sand.

Solution 49

(a) Buoyant force

(b) Force of friction

(c) Gravitational force

(d) Reaction force

Solution 50

If the area is made one-third i.e. $1m^2$, then the force would be:

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

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

$$= 3 \times 10$$

$$= 30N$$

If the area is made one-third i.e. $1m^2$, then the force would be:

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

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

$$= 1 \times 10$$

$$= 10N$$

Solution 51

Force, F= 550N
Area of contact of one shoe =160 cm^2 =160 x $10^{-4}m^2$
Area of contact with two shoes =160 x 2 =320 cm^2=320 x $10^{-4}m^2$

(a) If the girl stands on two feet,

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

$$= \frac{550}{320 x\ 10^{-4}} = 17187.5 N/m^2$$

(b)
If she stands on one foot,

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

$$= \frac{550}{160 x\ 10^{-4}} = 34375 N/m^2$$

Solution 52

Volume =3m^3
Mass = 9kg

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

$$\text{Density of substance} = \frac{9}{3} = 3 kg/m^3$$

And density of water = 1000kg/m3
The object will float in the water as the density of the object is less than the density of water.

The object will float in the water as the density of the object is less than the density of water.
Solution 53
The object will weigh less in water because an upward force (buoyant force) equal to the weight of water displaced acts on the object when immersed in water which reduces its weight apparently.
Solution 54
(a)

(a)

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

(b)
For material A:
Mass= 5kg
Volume =20 cm^3 = 20 x $10^{-6}m^3$

$$\text{Density of material A} = \frac{5}{20 \times 10^{-6}} = 0.25 \times 10^6 kg/m^3$$

For material B:
Mass =20kg
Volume =90 cm^3 = 90x $10^{-6}m^3$

$$\text{Density of material B} = \frac{20}{90 \times 10^{-6}} = 0.22 \times 10^6 kg/m^3$$

Density of material A is more than density of material B.

Solution 55
(a) The upward force acting on an object immersed in a liquid is called buoyant force.
Factors affecting buoyant force:
(i) Volume of object immersed in the liquid,
(ii) Density of the liquid.
(b) The cause of buoyant force is the greater upward pressure exerted by water underneath the object..
(c) Mass of water displaced = 600kg

Weight of water displaced, W =m x g
= 600 x 10 = 6000N
Since, the weight of water displaced by the boat is 6000N, therefore the buoyant force acting on the boat will also be 6000N.
Solution 56
(a) According to the principle of floatation: An object will float in a liquid if the weight of object is equal to the weight of liquid displaced by it.
Weight of object = Weight of liquid displaced by it.
(b) Weight of water displaced by boat= 6000N
(i) Buoyant force =6000N, as the weight of water displaced is equal to buoyant force.
(ii) Weight of a floating object = Weight of water displaced by it = 6000N
Solution 58
(a) Pressure is the force acting perpendicularly on a unit area of the object.

(a) Pressure is the force acting perpendicularly on a unit area of the object.

(b)

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

(c) (i) Pressure on an area of 10 m^2

Force =200N

$$\text{Pressure} = \frac{200}{10} = 20\text{Pa}$$

(ii) Pressure on an area of 5 m^2

Force =200N

$$\text{Pressure} = \frac{200}{5} = 40\text{Pa}$$

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