



PHYSICS

BOOKS - S CHAND IIT JEE

FOUNDATION

FORCE AND PRESSURE

Example

1. Find the pressure exerted by an object that has an area of 0.05 m^2 and a weight of 10N ?



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2. Find the weight of a rock that has an area of 20 m^2 and which exerts a pressure of 500 Pa.



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Question Bank 2 A

1. A force may cause in an object

A. change in inertia

B. change in mass

C. change in weight

D. none of these

Answer: C



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2. A force

A. is expressed in Newtons.

B. can cause an object to speed up, slow down, or change direction.

C. is a push or a pull

D. all of the above.

Answer: D



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3. Identify the following forces:

The force used to light up a match.



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4. Identify the following forces:

The force which changes the direction of a compass needle.



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5. Identify the following forces:

The force which pulls a meteorite in space towards a moon.



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6. Identify the forces that are operating while you are riding a bicycle.



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7. The unit of force is

A. kg

B. N

C. Pa

D. N/m^2

Answer: B



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8. Mass is measured in

A. litres

B. Newtons

C. centimetres

D. kilograms

Answer: D



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9. Your pair of shoes has a mass of 780 g. If each shoe has exactly the same mass, what is the weight of each shoe?



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10. Friction is a/an

A. self-adjusting force

B. necessary evil

C. important force in daily life

D. all of the above

Answer: D



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11. A nugget of gold is placed in a graduated cylinder that contains 100 mL of water. The water level rises to 350 mL after the nugget is

added to the cylinder. What is the volume of the gold nugget?



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12. Which of the following statements about weight is true?

A. Weight is a measure of the gravitational force on an object.

B. Weight varies depending on where the object is located in relation to the Earth.

C. Weight is measured by using a spring scale.

D. All of the above.

Answer: D



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13. When a bicycle travels on a rough surface, its speed

A. increases

B. decreases

C. remains the same

D. none of these

Answer: B



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14. It is difficult to walk on ice because of

A. little friction

B. absence of inertia

C. more inertia

D. more friction

Answer: A



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15. What is the S.I unit of pressure?

A. Newton/metre²

B. Newton

C. metre²

D. kg

Answer: A



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16. Which of the following is not an example of upthrust?

A. Upward force in water

B. Force acting on a stone

C. Upward force in milk

D. Upward force in oil

Answer: B



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17. The weight of a body is equal to

A. mass x gravity

B. mass/gravity

C. gravity/mass

D. none of these

Answer: A



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18. Which of the following may happen when an object receives unbalanced forces?

- A. The object changes direction.
- B. The object changes speed.
- C. The object starts to move.
- D. All of the above.

Answer: D



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19. A boy pulls a wagon with a force of 6 N east as another boy pushes it with a force of 3 N east. What is the net force?

A. 2 N

B. 18 N

C. 9 N

D. 3 N

Answer: C



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20. Biological forces, mechanical forces and frictional forces are the examples of:

- A. contact forces
- B. non-contact forces
- C. both (a) and (b)
- D. neither (a) nor (b)

Answer: A



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21. What must you know in order to calculate the gravitational force between two objects?

- A. their mass
- B. the distance between them
- C. both of the above
- D. none of these

Answer: C



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22. If you are in a spacecraft that has been launched into space, your weight would

A. increase because gravitational force is increasing.

B. increase because gravitational force is decreasing.

C. decrease because gravitational force is decreasing.

D. decrease because gravitational force is increasing.

Answer: C



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23. The gravitational force between 1 kg of lead and Earth is _____ the gravitational force between 1 kg of melon and earth----- ?

A. greater than

B. the same as

C. less than

D. none of the above

Answer: B



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24. You may sometimes hear on the radio or on TV that astronauts are weightless in space.

Explain why this statement is not true.



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25. An iron ball and a wooden ball of the same radius are released from a height ' h ' in vacuum. The time taken by both of them to reach the ground is

A. roughly equal

B. unequal

C. exactly equal

D. in the inverse ratio of their diameters

Answer: C



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26. Which of the following weigh the most?

A. on a boat

B. on the space shuttle

C. on the moon

D. on Venus

Answer: A



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27. If Earth's mass is doubled without changing its size, your weight would

A. increase because gravitational force increases

B. decrease because gravitational force increases

C. increase because gravitational force decreases

D. not change because you are still on Earth.

Answer: A



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28. Your friend thinks that there is no gravitation force in space. How could you explain to your friend that there must be gravitation force in space.



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29. The gravitational force on Jupiter is approximately 2.3 times the gravitational force on Earth. If an object has a mass of 80 kg and a weight of 784 N on Earth, what would the object's mass and weight on Jupiter be?



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30. We can hold a pen due to the

A. force of gravity

B. force of friction

C. force of weight

D. work done by our muscles

Answer: B



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31. The weight of a body on the surface of the earth is 10 kg. Its weight at the centre of the earth is

A. 0 kg

B. 5 kg

C. 10 kg

D. Infinite

Answer: A



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32. Explain why it is your weight and not your mass that would change if you landed on Mars.



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33. Flat-footed camels can walk easily in sandy deserts because

A. pressure on the sand is decreased by increasing the area of the surface in contact.

B. pressure on the sand is increased by increasing the area of the surface in contact.

C. pressure on the sand is decreased by decreasing the area of the surface in contact.

D. pressure on the sand is increased by decreasing the area of the surface in contact.

Answer: A



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34. Why is one end of a sewing needle made pointed?

- A. to increase the force
- B. to increase the pressure
- C. to decrease the weight
- D. none of the above.

Answer: B



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35. Give reasons for the following:

Magicians are able to lie down on a bed of nails.



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36. Give reasons for the following:

Walls of the water reservoir of a dam have to be made wider at the bottom.



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37. Give reasons for the following:

The tips of the cutting tools are made wedge-shaped.



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38. Give reasons for the following:

The feet of an elephant are large.



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39. Give explanations :

Skiers use long flat skis to slide over the snow.



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40. Give reasons for the following:

A man walking on the street slips on a banana skin.



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41. Give reasons for the following:

The soles of our shoes wear out gradually.



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42. Give reasons for the following:

It is difficult to walk on well polished floor or ice.



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43. A and B are two objects with masses 10 kg and 40 kg respectively. Then

A. A has more inertia than B

B. B has more inertia than A

C. A and B have the same inertia

D. Neither A nor B has any inertia

Answer: B



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44. A steel chain consists of 50 links connected to each other. The chain is pulled by applying force F at each of its ends. What is the magnitude of force induced in each link?

A. $F / 50$

B. F

C. $50 F$

D. $F / 25$

Answer: B



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45. A long chain having 100 identical steel links is to be pulled from its two ends by a force of 3000 Newtons. The chain is elongated by adding another 50 links to it. Which one of the following is the correct statement?

A. The force induced in each link will be equal to 20 Newtons.

B. The force induced in each link will be equal to 30 newtons.

C. The force induced in each link will be equal to 3000 newtons.

D. The force induced in each link cannot be determined unless its dimensions are given.

Answer: A



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46. Pressure cannot be measured in

A. N/m^2

B. bar

C. Pa

D. kg wt

Answer: D



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47. When the force remains constant and area is less, the pressure will

A. increase

B. decrease

C. first increase then decrease

D. first decrease then increase

Answer: A



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48. When depth increases the pressure _____

?

A. increases

B. remains constant

C. first decreases then increases

D. decreases

Answer: A



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49. When a constant force is applied to a body,
it moves with uniform

A. speed

B. velocity

C. acceleration

D. momentum

Answer: C



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50. A piece of wood is floating in water. When the temperature of water rises, the apparent weight of the wood will

A. increase in size

B. rise a little

C. float at the same level

D. sink a little

Answer: D



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51. The bottom of a dam is made thick as:

A. the water exerts low pressure on bottom wall

B. it is a custom

C. it looks beautiful

D. the water exerts more pressure on bottom of the wall

Answer: D



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52. The buoyant force depends on the

- A. depth of a liquid
- B. colour of a liquid
- C. density of a liquid
- D. none of these

Answer: C



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53. A body of wood has a weight W and volume V . The apparent weight of this body after making it float on water will be

A. $\frac{W}{V}$

B. $W \times V$

C. W

D. Zero

Answer: D



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54. Where would the pressure of sea water be maximum?

A. Below 100 metres from the surface.

B. Below 80 metres from the surface.

C. Below 105 metres from the surface.

D. Below 10 metres from the surface.

Answer: C



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55. If the force remains constant and the area is doubled, then the pressure will be

A. half

B. three times

C. two times

D. none of these

Answer: A



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56. Two objects losing the same weight when immersed in water must have the same

A. weight in water

B. volume

C. weight in air

D. density

Answer: B



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57. The hot air balloon rises because it is

A. denser than air

B. less dense than air

C. equally dense as air

D. The given statement is wrong

Answer: B



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58. A piece of ice is floating in a glass vessel filled with water. How will the level of water in the vessel change when the ice melts ?

A. It will rise

B. It will go down

C. It will remain unchanged

D. It will first go up but later on it will go down.

Answer: C





59. The balls of iron and aluminium of same diameter are dipped in water. Which of the following is the correct statement?

- A. The upthrust on iron ball will be more than on the aluminium ball.
- B. The upthrust on aluminium ball will be more than on the iron ball.
- C. The upthrust on both will be the same.

D. None of the above.

Answer: C



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60. The height of mercury which exerts the same pressure as 20 cm of water column, is

A. 1.47 cm

B. 14.8 cm

C. 148 cm

D. none of these

Answer: A



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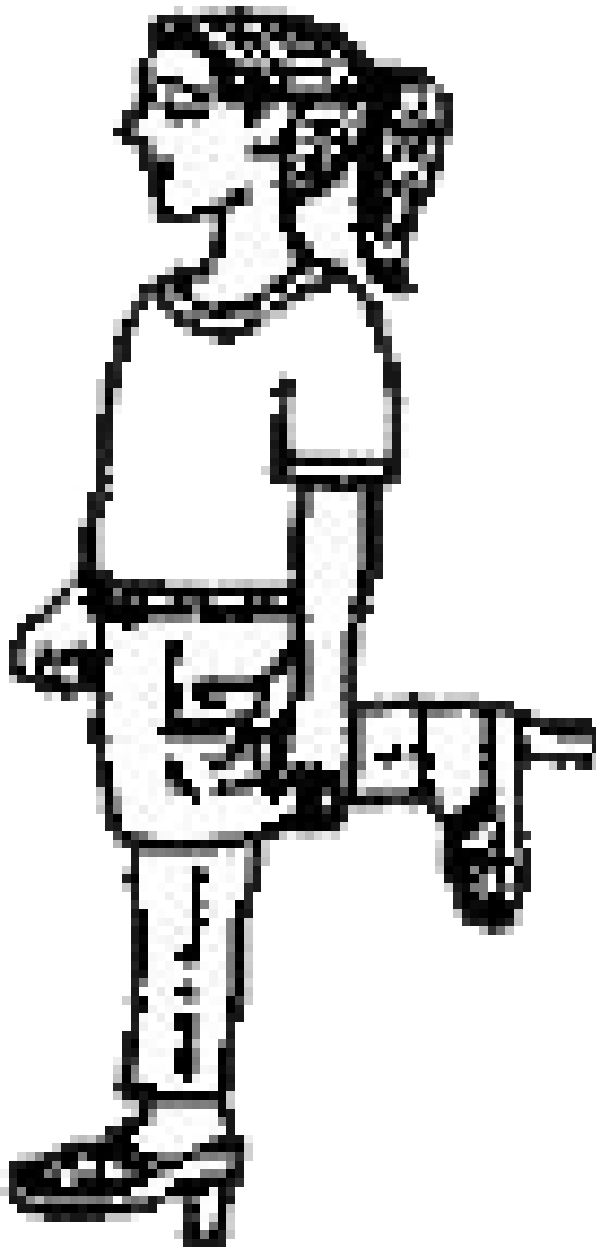
61. An elephant weighing 60,000 N stands on one foot covering an area of 1000 cm^2 . Find the pressure exerted by the elephant on the ground.



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62. Find the pressure exerted by a girl weighing 500 N standing on one stiletto heel

of area 1cm^2 .





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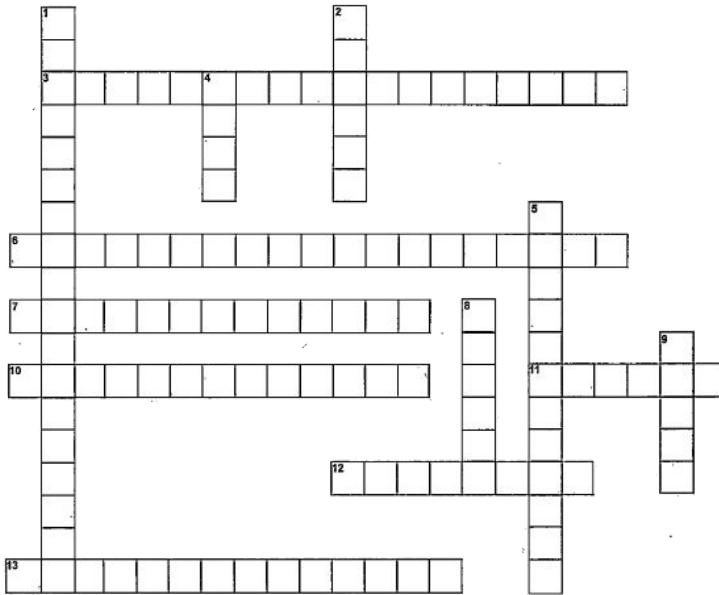
63. Create a concept map using the following terms.

contact forces, non-contact forces, friction, push, pull, upthrust, twist, gravitational force, magnetic force, electrostatic force, atmospheric pressure, fluid pressure, pascal.



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64. Solve the following crossword using the given clues:



ACROSS

3. Principle relating to the apparent weight of a body when immersed in water.

6. Pressure caused by the weight of the air

7. Forces that require physical contact between objects

10. The force that exists between two magnets.

11. Unit of force

12. The resistance to movement that occurs when two bodies are in contact

13. The state when a person does not feel any sensation of weight.

DOWN

1. The pull of the earth

2. SI unit of pressure

4. Measure of the amount of matter in a physical body

5. The upward force that a fluid exerts on an object that is immersed in the fluid.
8. The force with which the earth pulls a body towards its centre.
9. Something that tends to cause movement of a body.



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Self Assessment Sheet

1. Give reasons for the following.

Spikes are provided in the shoes of players.



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2. Why are grooves provided in the soles of shoes ?



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3. 1 N force is exerted on the palm of a child and the same force is also exerted on the palm of a man. Who of the following will feel more pressure ?

A. Man

B. Child

C. Both the man and the child

D. None of the above

Answer: B



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4. One boy is carrying a bucket of water by his one hand and wooden cube in his other hand. If he places the wooden cube in the bucket of water, then he will feel

- A. less weight
- B. more weight
- C. same weight
- D. none of these

Answer: B



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5. What force is required to exert a pressure of 40,000 Pa on an area of 1 cm^2 ?



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6. Find out the area of a body which experiences a pressure of 60,000 Pa by a force of 500 N ?



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7. Why is it easy to slip when there is water on the floor?

A. The water is a lubricant and reduces the friction between your feet and the floor.

B. The friction between your feet and the floor changes from kinetic to static friction.

C. The water increases the friction between your feet and the floor.

D. The friction between your feet and the floor changes from sliding kinetic friction to rolling kinetic friction.

Answer: A



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8. If a rock is brought from the surface of the moon

A. its mass will change

B. its weight will change, but not mass

C. both mass and weight will change

D. its mass and weight will remain the same

Answer: B



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9. The pressure on earth will be least when the man is

A. lying

B. sitting

C. standing on one foot

D. standing on two feet

Answer: A



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10. The force which slows down or stops the ball kicked by you is

A. gravitational force

B. frictional force

C. muscular force

D. mechanical force

Answer: B



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11. The force required to lift 200 g of mass vertically against the force of gravity is expressed in

A. Newton

B. gram force

C. kilogram force

D. all of these

Answer: A



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