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India's Number 1 Education App

## PHYSICS

# BOOKS - PEARSON IIT JEE 

## FOUNDATION

## Force and Pressure

Example

1. Two constant forces 4 N and 5 N act on a
body in opposite directions .Find the resultant
force on the body

## D Watch Video Solution

2. $A$ and $B$ are two persons playing tug of war and forces exerted by them are 50 and 30 N respectively.If $C$ is the centre point, predict its position and find out the magitude and direction of the resulatant force?

## - Watch Video Solution

3. One person is pushing a box $A$ of certain mass with 100 N force .Another box B of the
same mass is pushed of in the same direction by other two persons .each of whom is exerrting 35 N force. The force is exerted on box $A$ is just sufficient to make it move .Will the box $B$ move ? Give reason in support of your answer.

## Watch Video Solution

4. Two solid cylinders $A$ and $B$ of the same mass are rolling on a give surface .If radius of $B$ is double than of $A$, then compare the rolling friction acting for them.

## D Watch Video Solution

5. Minnimum 1 kpa pressure is required to
carry out an activity .A machine which can
apply $10^{5} \mathrm{~N}$ force is use for this purpose .What should be the maxium area on which this force
is required to be applied so that the activity can be carried out?

## D Watch Video Solution

6. 5 pa os pressure is required to be exerted on an are of $250 m^{2}$.A box is placed on that area and the surface of cantact is exactly $250 m^{2}$.What should be the mass of the box so that exactly 5 pa of pressure can be exerted?

## - Watch Video Solution

## Very Short Type Que

1. If the spring balance graded in gravitational units (CGS syste1n) shows 20 as the reading, then mass of the body is $\qquad$

## - Watch Video Solution

2. The direction of motion of a tree appears to
be $\qquad$ ' when a passenger observes it from a moving train .

## 3. Maglev trains work based on

## - Watch Video Solution

4. The contact force acting on a dropped body is

## D Watch Video Solution

5. One newton is the weight acting on the mass of

D Watch Video Solution
6. Which of the following acts on a body from
a very far distance?
A. Electric force
B. Magnetic force
C. Gravitational force

## D. Frictional force

## Answer: A:B:C

## D Watch Video Solution

## 7. Which of these is not a unit of force?

A. Kilogram force
B. Newton
C. Gram weight
D. None of these

## Answer: D

## D Watch Video Solution

8. Electric force exists between
A. Two masses
B. Two magnets
C. Two electrons
D. Two bodies
9. Choose an example from the following where action and reaction pair exists
A. A book placed on a table.
B. A person walking on the road.
C. A 1 kg mass suspended to a spring balance.
D. All the above

## Answer: D

## - Watch Video Solution

10. Choose the incorrect one from the

## following.

A. Electrical forces can be attractive (or)
repulsive in nature and are short range
forces
B. Gravitational forces are attractive in
nature and they are long range forces
C. Magnetic lines of force cannot exist with
a single magnetic pole.
D. The energy of flowing water is used to
produce necessary force which runs a
generator to produce electric current

## Answer: A

## D Watch Video Solution

## 11. Static friction is a

 force.
## - Watch Video Solution

12. Air friction can be reduced by ____ the shape of the objects.

## - Watch Video Solution

13. Air friction can be reduced by making the shape of the objects
14. Static friction between two surfaces

- Watch Video Solution

15. Friction always acts ___ to the surface.

- Watch Video Solution

16. A child is trying to drag water tin but fails
because
A. Applied force is not sufficient.
B. Applied force is cancelled by frictional
force.
C. Static friction is not sufficient
D. Both (a) and (b)

Answer: D
17. Which of the following is not possible?
A. Sliding friction can be converted into
rolling friction
B. Rolling friction increases with area of
contact
C. Sliding friction can be converted into
static friction
D. None of these

## - Watch Video Solution

18. Force of friction cannot be reduced by
A. Ball bearings
B. Lubricants
C. Smoothening the surface
D. Increasing the weight of body

## 19. Frictional force causes

A. Wear and tear of a machine
B. Energy loss in the form of heat
C. Motion in a body
D. Both (a) and (b)

## Answer: D

20. Rohit stepped on a banana peel while walking, so he slipped off
A. Due to the less amount of sliding
friction under his foot.
B. Due to the absence of static friction
under his foot
C. Due to the absence of rolling friction of banana peel.

# D. Due to the presence of kinetic friction 

under his foot

## Answer: A

## D Watch Video Solution

21. The product of pressure and area gives

- Watch Video Solution

22. Pressure is inversely proportional to

D Watch Video Solution
23. SI unit of pressure is

- Watch Video Solution

24. One atm $=$

## 25. $1 \mathrm{Nm}^{-2}=$ dyne $\mathrm{cm}^{-2}$

## - Watch Video Solution

26. Which of the following quantities does not have direction?

A. Force

B. Acceleration
C. Pressure

## D. Velocity

## Answer: C

## D Watch Video Solution

## 27. Pressure is directly proportional to

A. Force
B. Thrust
C. Area
D. Velocity

## - Watch Video Solution

28. Sharp edges can apply
A. Less pressure than blunt edges
B. Less force than blunt edges.
C. More pressure than blunt edges
D. None of these
29. Which of the following water columns exerts the highest pressure on the bottom of the container?
A. 10 km
B. 100 m
C. 1000 m
D. 5000 m
30. Which among the following animals generally exerts less pressure on sand so that it moves fast m the desert?
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B. Elephant
C. Horse
D. Camel
31. What is force ? Mention the effects of force

D Watch Video Solution
32. Distinguish between contact and noncontact forces .

- Watch Video Solution

33. What are consequential forces ? Give any one examples .

- Watch Video Solution

34. Mention the forces that exist in nature .

## D Watch Video Solution

35. Define rest and motion.

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36. Define the gravitational untis of force and relate them.

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37. Define weight. What is the weight of mass 2 grams ing SI system?
38. Write the nature of forces involved in the following case
( a) A cylinder is rolling on the gorund
(b) A vertically projected stone.

## - Watch Video Solution

39. Does anybody exsit without and force acting on it ?
40. Mention the magnitude and direction of the net force for each case . (Takes $g=10 m s^{-2}$ )


D View Text Solution
41. Does a situation exist where two force act on a body without affecting it ? Explain with an example.

## - Watch Video Solution

42. From the figure analyse the situation and explain the nature of forces acting on the
following bodies .
(a) $\underset{A}{\square} \quad \vec{B}$
(b) "114!1"!t


## - Watch Video Solution

43. Does the forces ,like gravitainal ,electric and magnetic forces affect each other? If not ,why ?
44. If there any difference between mass and weight ? If So, what is the difference?

## - Watch Video Solution

45. Write a situation where aciton reaction
forces do not exist .

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46. Why would any small object coming from space cathes fire entering into the Earh's atmosphere?

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47. Write any four advantges of fricttion.

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48. Static friction is a self-adjusting force . Jutify the statement .

- Watch Video Solution

49. Why are ships ,aeroplanes and sports cars strem lined in shape ?
50. Define : a. static friction b. dynamic friction
c. rolling friction d. limiting friction
A. Staic friction
B. Dynamic friction
C. Rolling friction and
D. Limiting friction

Answer: A
( Watch Video Solution
51. On a block of mass 10 kg a child applied a
force of 5 N .Explain the position of block and kind of friction acts on it .

## - Watch Video Solution

52. The force exerted on a moving bike by its
engine is 180 N and the roughness of the road appplies a retarding force of 5 N on its tyrest
.Find the forces that accelerates the vehicle and also mention the type of friction involved here .

## - Watch Video Solution

53. Ammu ,a second class student of mass 15 kg is sliding over a slide inclined at an angle of $30^{\circ}$ but her motion stopped at the middle of the side .What would be the reson for this?

## (D) Watch Video Solution

54. Choose the case where minimum friction acts
(a) When a person walks on the road.
(b) When a person walks on wet marble floor.
(c) When a person walks on sand floor.

## - Watch Video Solution

55. Friction can be resuced by providing wheels .Explain the statement with an example

- Watch Video Solution

56. Explain how maximum static friction is called limiting friction.

D Watch Video Solution
57. What is the purpose of oiling machinery?

## D Watch Video Solution

58. Lasya is watering the plants in her graden
with a pipe of area of cross- section ' $A$ ' and
observed that the force of water from the pipe
is ' $F$ ' .Find the change in area of caross section of the pipe to attain a pressure difference which is 1.5 times that of the intial.

## D Watch Video Solution

59. Explain with an example how frictional force depends on the area of contact.
60. Complete the table given below.


## ( Watch Video Solution

## 61. Define pressure. What is its unit?

- Watch Video Solution

62. A camel weighs $20,000 \mathrm{~N}$. The area of its
foot is $100 \mathrm{~cm}^{2}$. How much pressure does it exert on the ground by its single foot?

## D Watch Video Solution

63. Pressure at the bottom of a sea is much greater than that at its surface. Explain it

## D Watch Video Solution

64. When a man swims under water, he feels a pain on his eardrums. Why?

D Watch Video Solution
65. Why coolie wear turbans on their heads while carrying heavy loads?

- Watch Video Solution

66. For the reduction of NADP to $N A D P H_{2}$

Are required along with the electrons
that come from ferredoxin.

## D Watch Video Solution

67. If a Lilliput in his sleeping position occupies
an area of $5 \mathrm{~cm}^{2}$ and on standing position
occupies $2 \mathrm{~cm}^{2}$ of area, then fmd the ratio of pressures exerted by him in béth the positions
68. Why does an army tanker have caterpillar wheels rather than ordinary wheels?

## D Watch Video Solution

69. How many atmospheric pressures is equal to the pressure of 2 kPa ?

- Watch Video Solution

70. A cauboid of volume $20 m \times 10 m \times 5 m$ has density $3 \mathrm{kgm}^{-3}$. Find the maximum pressure exerted by cuboid on the surface .

## D Watch Video Solution

71. A bunch of five identical balloons can lift a toy of weight 100 N . Find out the pressure inside a single balloon to do this, if the radius of the balloon is $\frac{1}{\sqrt{\pi}} \mathrm{~m}$
72. Mercury level in a thermometer changed from $10^{\circ} \mathrm{C}$ to $20^{\circ} \mathrm{C}$. If 0.5 Pa pressure is increased in average per each degree rise in temperature, then express the change in average thrust acting on the walls of container between these temperatures in terms of thrust at $10^{\circ} \mathrm{C}$ and the area of cross sec tion ofcapillary tube is uniform (Consider average pressure at $10^{\circ} C$ as 5 Pa ).
73. A cube of 1 m length is under the pressures given in the figure. Find the magnitude and the direction of the net force on it.

$$
110 \mathrm{~N}
$$


74. P amount of lateral pressure is applied on either sides of a cuboidal dough horizontally.

The length of the dough is reduced to half resulting change only in the height, then fmd the pressure applied by the dough at the bottom of it.
75. The compression ofsofa is more when we Sit On it than when we lie on it. Why?

## D Watch Video Solution

## Concept Application

1. If a force of 10 N can accelerate a body of mass ' m ' by $1 m s^{-2}$, then a force of 100 N can accelerate the same body by

$$
\text { A. } 10 m s^{-2}
$$

B. $1 m s^{-2}$
C. $100 m s^{-2}$
D. $0.1 m s^{-2}$

Answer: A

- Watch Video Solution

2. There are four forces acting on a block as
shown in the figure , The magnitude and

A. 150 N , towards right
B. 100 N , upwards
C. 70 N , towards right
D. 70 N , towards left

Answer: C

## - Watch Video Solution

3. A cylindrical vessal is filled with water as
shown in the figure .Calculate the difference in
pressure due to water at points $A$ and $B$.
(Pressure due to air is negligible ,density of
water $=1 \mathrm{gcm}^{-3}$ )

A. 600 Pa
B. 1200 Pa
C. 6 Pa

## D. 6000 Pa

## Answer: D

## D Watch Video Solution

4. An iron cylindar of base area $7 \mathrm{~cm}^{2}$ and mass

10 kg is melted and reshaped into a into a rod of area of cross section $1 \mathrm{~cm}^{2}$.Calculate the increase in the pressure exerted on a plane surface when both the cylinder and the rod

$$
\left(g=10 m^{-2}\right)
$$

A. $100 \times 10^{4}$ pa
B. $10 \times 10^{4} \mathrm{~Pa}$
C. $14.28 \times 10^{4} \mathrm{~Pa}$
D. $85.72 \times 10^{4} \mathrm{~Pa}$

Answer: D
( Watch Video Solution
5. Akash can move an iron block at rest ,placed on a metal sheet by pushing it with a force of

50 N . When a lubricant is applied on the effort is reduced to do the same activity. The force
with which the block can be moved in the second case is $\qquad$ .
A. 25 N
B. 37.5 N
C. 12.5 N
D. 50 N

Answer: B

## D Watch Video Solution

6. If a force of 10 N can accelerate a body of
mass 'm' by $1 m s^{-2}$, then a force of 100 N can
accelerate the same body by
A. $10 \mathrm{~ms}^{-2}$
B. $1 \mathrm{~ms}^{-2}$
C. $100 \mathrm{~ms}^{-2}$
D. $0.1 \mathrm{~ms}^{-2}$

Answer: A

## - Watch Video Solution

7. There are four forces acting on a block as
shown in the figure. The magnitude and direction of the net force acting on it is


50 N
A. 150 N , towards right
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C. 70 N , towards right
D. 70 N , towards left

## Answer: C

## D Watch Video Solution

8. A cylindrical vessel is filled with water as shown in the figure. Calculate the difference in pressures due to water at points $A$ and $B$.
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- Watch Video Solution


## Assessment Test

1. What is the gravitaional force acting on 2 kg mass ? [Take $\mathrm{g}=10 \mathrm{~ms}^{\wedge}(-2)^{`}$ ]
(D) Watch Video Solution

## 2. What force is existing within an atom?

## - Watch Video Solution

## 3. Express 1 MN in dynes

## D Watch Video Solution

4. Write any two contact and non-contact foces.
5. What are the effects of forces acting on the objects?

## - Watch Video Solution

6. What is the direction of frictional force
actiog on a body moving or sliding towards east?

## 7. Write any two examples that show friction is

 an evil.
## ( Watch Video Solution

8. Write the SI and CGS units of friction.

## D Watch Video Solution

9. What are the factors on which friction is not dependent?
10. What are the necessary things required to reduce friction?

- Watch Video Solution

11. Atmospheric Pressure

- Watch Video Solution


## 12. What are SI CGS untis of pressure?

## D Watch Video Solution

13. Express 20 SI units of pressure in its CGS
unit

D Watch Video Solution
14. Why do we use knife to cut fruits ?
15. Explain why, school bags are provided with wide straps to carry them.

## D Watch Video Solution

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- View Text Solution

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26. Define (i) atmospheric pressure (ii) one atmosphere.

## 27. What are SI CGS untis of pressure?

## - Watch Video Solution

28. Express 20 SI units of pressure in its CGS
unit

- Watch Video Solution

29. Why do we use knife to cut fruits ?
30. We prefer school bags with wider straps.

Why?

D View Text Solution

Crosswoard

1. Solve
the
puzzle


- View Text Solution

Examples

1. Two constant forces 4 N and 5 N act on a body in opposite directions .Find the resultant force on the body

## D Watch Video Solution

2. $A$ and $B$ are two persons playing tug of war and forces exerted by them are 50 and 30 N respectively.If $C$ is the centre point, predict its position and find out the magitude and direction of the resulatant force?
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## - Watch Video Solution

## Test Your Concepts Very Short Answer Type

 Questions Fill In The Blanks1. If the spring balance graded in gravitational units (CGS syste1n) shows 20 as the reading,
then mass of the body is $\qquad$ kg.

## D Watch Video Solution

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D View Text Solution
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- Watch Video Solution

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## D Watch Video Solution

7. Air friction can be reduced by ___ the
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## - Watch Video Solution

8. Frictions between highly smooth surfaces is

## D Watch Video Solution

9. Friction comes into action when there is between the two surfaces

## - Watch Video Solution

10. Friction always acts to the surface.

## ( Watch Video Solution

11. The product of pressure and area gives

## ( Watch Video Solution

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D Watch Video Solution
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- Watch Video Solution

14. One atm $=$ $\qquad$ .
15. $1 \mathrm{~N} \mathrm{~m}^{-2}=$ dyne $\mathrm{cm}^{-2}$
( Watch Video Solution

## Test Your Concepts Very Short Answer Type Questions Select The Correct Alternative From The Given Options

1. Which of the following acts on a body from a very far distance?
A. Electric force
B. Magnetic force
C. Gravitational force
D. Frictional force

## Answer: C

D Watch Video Solution
2. Which of these is not a unit of force?
A. Kilogram force
B. Newton
C. Gram weight
D. None of these

## Answer: D

## D Watch Video Solution

## 3. Electric force exists between

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B. Two magnets

## C. Two electrons

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4. Choose an example from the following where action and reaction pair exists
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7. Which of the following is not possible?
A. Sliding friction can be converted into
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## Answer: C

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A. Ball bearings
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Answer: A
( Watch Video Solution
11. Which of the following quantities does not have direction?
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D Watch Video Solution
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A. Dog
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- Watch Video Solution

Test Your Concepts Short Answer Type Questions

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## D Watch Video Solution

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of the pipe to attain a pressure difference which is 1.5 times that of the initial.
32. Explain with an example how frictional
force depends on the area of contact.
( Watch Video Solution
33. Complete the table given below :

| S. No | Pressure (P) | Force (F) | Area (A) |
| :---: | :---: | :---: | :---: |
| 1. | $\ldots \mathrm{Pa}$ | 10 N | $5 \mathrm{~cm}^{2}$ |
| 2. | $[$ atm | $5 \times 10^{5} \mathrm{~N}$ | $5 \mathrm{~m}^{2}$ |
| 3. | 0.7 Pascal | ___ dyne | 10 MKS units |
| 4. | $8 \times 10^{-5} \mathrm{~atm}$ | $8 \mathrm{~kg} \mathrm{~m} \mathrm{~s}^{-2}$ | $\square \mathrm{cm}^{2}$ |

D View Text Solution

## 34. Define pressure. What is its unit?

## - Watch Video Solution

35. A camel weighs $20,000 \mathrm{~N}$. The area of its
foot is $100 \mathrm{~cm}^{2}$. How much pressure does it exert on the ground by its single foot?

## D Watch Video Solution

36. Pressure at the bottom of a sea is much greater than that at its surface. Explain it

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37. When a man swims under water, he feels a pain on his eardrums. Why?
38. Why coolie wear turbans on their heads while carrying heavy loads?

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39. Why sledges are not provided with wheels?

## D Watch Video Solution

40. If $a$ Lilliput in his sleeping position
occupies an area of $5 \mathrm{~cm}^{2}$ and on standing
position occupies $2 \mathrm{~cm}^{2}$ of area, then fmd the ratio of pressures exerted by him in béth the positions

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41. Why does an army tanker have caterpillar wheels rather than ordinary wheels?

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42. How many atmospheric pressures is equal to the pressure of 2 kPa ?

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43. A cauboid of volume $20 m \times 10 m \times 5 m$
has density $3 \mathrm{kgm}^{-3}$. Find the maximum pressure exerted by cuboid on the surface .

## D Watch Video Solution

44. A bunch of five identical balloons can lift a toy of weight 100 N . Find out the pressure inside a single balloon to do this, if the radius of the balloon is $\frac{1}{\sqrt{\pi}} \mathrm{~m}$

## - Watch Video Solution

45. Mercury level in a thermometer changed
from $10^{\circ} \mathrm{C}$ to $20^{\circ} \mathrm{C}$. If 0.5 Pa pressure is increased in average per each degree rise in temperature, then express the change in
average thrust acting on the walls of container between these temperatures in terms of thrust at $10^{\circ} C$ and the area of cross section of capillary tube is uniform (Consider average pressure at $10^{\circ} \mathrm{C}$ as 5 Pa ).

## D View Text Solution

46. A cube of 1 m length is under the pressures
given in the figure. Find the magnitude and
the direction of the net force on it.

## $\downarrow 10 \mathrm{~N}$

## D View Text Solution

47. P amount of lateral pressure is applied on either sides of a cuboidal dough horizontally.

The length of the dough is reduced to half resulting change only in the height, then fmd the pressure applied by the dough at the bottom of it.

## D Watch Video Solution

48. The compression ofsofa is more when we

Sit On it than when we lie on it. Why?

## 1. CROSSWORD



## Across

2. Viscous drag is a
3. Necessary thing for the existence of electric force
4. $10^{5} \mathrm{P}_{1}=$
5. Force is a
6. What is the SI unit of a force?
Down
7. Pressure is a $\qquad$
8. What is the mass of 2 gram weight of a body?
9. Atmospheric pressure is measured in $\qquad$
10. Pressure acting on a body depends on $\qquad$
11. How much is the lateral pressure difference at a point inside a hquid?

## D View Text Solution

