



PHYSICS

BOOKS - PEARSON IIT JEE FOUNDATION

Force and Pressure



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



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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?

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.



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.

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5. Minnimum 1 kpa pressure is required to carry out an activity .A machine which can apply 10^5 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 ?



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



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

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2. The direction of motion of a tree appears to

be ______ ' when a passenger observes it from

a moving train .

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

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

A. Kilogram force

B. Newton

C. Gram weight

D. None of these





8. Electric force exists between

A. Two masses

- B. Two magnets
- C. Two electrons
- D. Two bodies

Answer: C



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



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



13. Air friction can be reduced by making the

shape of the objects





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





18. Force of friction cannot be reduced by

A. Ball bearings

- B. Lubricants
- C. Smoothening the surface
- D. Increasing the weight of body

Answer: D



- 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

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Answer: A

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21. The product of pressure and area gives



23. SI unit of pressure is

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24. One atm =_____



26. Which of the following quantities does not

have direction?

A. Force

B. Acceleration

C. Pressure

D. Velocity

Answer: C

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27. Pressure is directly proportional to

A. Force

B. Thrust

C. Area

D. Velocity





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

Answer: C



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?

A. Dog

B. Elephant

C. Horse

D. Camel

Answer: D



contact forces .

33. What are consequential forces ? Give any

one examples .



34. Mention the forces that exist in nature .



35. Define rest and motion.

36. Define the gravitational untis of force and

relate them.



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

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42. From the figure analyse the situation and explain the nature of forces acting on the

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43. Does the forces ,like gravitainal ,electric and magnetic forces affect each other ? If not ,why ?



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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

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 .

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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

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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.



55. Friction can be resuced by providing

wheels .Explain the statement with an example



56. Explain how maximum static friction is called limiting friction. Watch Video Solution **57.** What is the purpose of oiling machinery? 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.



59. Explain with an example how frictional

force depends on the area of contact.

60. Complete the table given below.



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



63. Pressure at the bottom of a sea is much

greater than that at its surface. Explain it



64. When a man swims under water, he feels a

pain on his eardrums. Why?

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65. Why coolie wear turbans on their heads

while carrying heavy loads?

66. For the reduction of NADP to $NADPH_2$ Are required along with the electrons that come from ferredoxin.



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



68. Why does an army tanker have caterpillar

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



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 $\frac{1}{\sqrt{\pi}}$ m

72. Mercury level in a thermometer changed from 10° C to 20° 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 sec tion of capillary 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.



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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?



Concept Application

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

A. $10ms^{-2}$

B. $1ms^{-2}$

C.
$$100 m s^{-2}$$

D. $0.1ms^{-2}$

Answer: A

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2. 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 ____



A. 150 N, towards right

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

Answer: C



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





A. 600 Pa

B. 1200 Pa

C. 6 Pa

D. 6000 Pa

Answer: D



4. An iron cylindar of base area $7cm^2$ and mass 10 kg is melted and reshaped into a into a rod of area of cross section $1cm^2$.Calculate the increase in the pressure exerted on a plane surface when both the cylinder and the rod

are made to stand vertically on a plane surface

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

A.
$$100 imes10^4$$
 pa

B. $10 imes 10^4$ Pa

C. $14.28 imes 10^4 Pa$

D. $85.72 imes 10^4 Pa$

Answer: D



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

A. 25 N

B. 37.5N

C. 12.5 N

D. 50 N

Answer: B



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

- A. $10 \, \mathrm{ms}^{-2}$
- B.1 ${\rm ms}^{-2}$
- C. $100 \, \mathrm{ms}^{-2}$
- D. $0.1 \, {
 m ms}^{-2}$

Answer: A



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1. What is the gravitaional force acting on 2 kg

mass ? [Take g = 10ms^(-2)`]



2. What force is existing within an atom?



5. What are the effects of forces acting on the

objects?



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 .



9. What are the factors on which friction is not

dependent ?





10. What are the necessary things required to

reduce friction ?

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11. Atmospheric Pressure
12. What are SI CGS untis of pressure ?



13. Express 20 SI units of pressure in its CGS

unit

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14. Why do we use knife to cut fruits ?

15. Explain why, school bags are provided with

wide straps to carry them.



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30. We prefer school bags with wider straps. Why?



Crosswoard



10

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Examples

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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

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2. Which of these is not a unit of force?

A. Kilogram force

B. Newton

C. Gram weight

D. None of these

Answer: D

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3. Electric force exists between

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4. Choose an example from the following

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5. Choose the incorrect one from the following.

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Answer: A

11. Which of the following quantities does not

have direction?

A. Force

B. Acceleration

C. Pressure

D. Velocity

Answer: C

12. Pressure is directly proportional to

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B. Thrust

C. Area

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Answer: B



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3. What are consequential forces ? Give any

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13. Does a situation exist where two force act on a body without affecting it ? Explain with an example .



14. From the figure analyse the situation and explain the nature of forces acting on the following bodies.





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32. Explain with an example how frictional force depends on the area of contact.



33. Complete the table given below :

| S. No | Pressure (P) | Force (F) | Area (A) |
|-------|------------------------|---------------------------|------------------|
| 1. | Pa | 10 N | 5 cm^2 |
| 2. | atm | $5 \times 10^5 \text{ N}$ | 5 m ² |
| 3. | 0.7 Pascal | dyne | 10 MKS units |
| 4. | 8×10^{-5} atm | 8 kg m s ⁻² | cm ² |



34. Define pressure. What is its unit?



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



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



1. CROSSWORD



Across

- Viscous drag is a
- 6. Necessary thing for the existence of electric force
- 8. 10⁵ P₄ =
- 9. Force is a
- 10. What is the SI unit of a force?

Down

- 1. Pressure is a _____
- 3. What is the mass of 2 gram weight of a body?
- 4. Atmospheric pressure is measured in _____
- 5. Pressure acting on a body depends on _____
- How much is the lateral pressure difference at a point inside a liquid?

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