



# PHYSICS

**BOOKS - JEEVITH PUBLICATIONS**

**PHYSICS (KANNADA ENGLISH)**

## LAWS OF MOTION

**One Mark Question**

1. Define inertia.



**Watch Video Solution**

2. Define force.



[Watch Video Solution](#)

3. Define linear momentum.



[Watch Video Solution](#)

4. Mention the absolute unit of linear momentum.



[Watch Video Solution](#)

5. Say whether linear momentum is a scalar or a vector physical quantity.



[Watch Video Solution](#)

6. What is the change in linear momentum of a body describing uniform circular motion between the ends of a diameter.



[Watch Video Solution](#)

7. Define impulsive force.



**Watch Video Solution**

8. Define impulse .



**Watch Video Solution**

9. What is the unit of impulse?



**Watch Video Solution**

**10.** What does a constant force applied on a body produce?



**Watch Video Solution**

**11.** Define the *SI* unit of force.



**Watch Video Solution**

**12.** Mention the gravitational unit of force?





[Watch Video Solution](#)

13. Write the relationship between gravitational unit and absolute unit of force.



[Watch Video Solution](#)

14. Define  $1\text{kgwt}$  of force.



[Watch Video Solution](#)

15. State Newton's *I* law of motion.



[Watch Video Solution](#)

16. State Newton's *II* law of motion.



[Watch Video Solution](#)

17. State Newton's *III* law of motion.



[Watch Video Solution](#)

**18.** What definitions do we get from the Newton's *I* law of motion?



**Watch Video Solution**

**19.** What information does Newton's *II* law of motion provide us?



**Watch Video Solution**



**20.** State and prove conservation of linear momentum in case of collision of two bodies.



**Watch Video Solution**

**21.** What is the unit of impulse?



**Watch Video Solution**

**22.** INERTIAL FRAME OF REFERENCE



**Watch Video Solution**

**23.** Write the equation for a pseudo force on a body in a lift uniformly accelerated upwards.



**Watch Video Solution**

**24.** Give the expression for pseudo force on a body in a lift uniformly accelerated downwards.



**Watch Video Solution**

**25.** What will be the pseudo force on a body in a lift uniformly accelerated downwards with an acceleration equal to the acceleration due to gravity?



**Watch Video Solution**

**26.** What is frame of reference?



**Watch Video Solution**

**27.** Name any one force that acts at a distance.



**Watch Video Solution**

**28.** Which force is the weakest force of nature?



**Watch Video Solution**

**29.** Which is the strongest force of nature?



**Watch Video Solution**

**30.** Compare electrostatic force with gravitational force and strong nuclear force.



**Watch Video Solution**

**31.** Compare strong nuclear force with electric force.



**Watch Video Solution**

**32.** A boxer becomes more tired boxing in the air than against the opponet. Why?



**View Text Solution**

**33.** Can a system of blanaced forces acting on a body produce an acceleration in it.



**Watch Video Solution**

**34.** How is the linear momentum related to the mass of a body?



**Watch Video Solution**

**35.** Give the expression for potential energy stored in a spring.



**Watch Video Solution**

**36.** What is friction?



[Watch Video Solution](#)

**37.** Define frictional force.



[Watch Video Solution](#)

**38.** What is static friction?



[Watch Video Solution](#)

**39.** Is static force a self adjusting force?





[Watch Video Solution](#)

**40.** What is meant by limiting friction?



[Watch Video Solution](#)

**41.** Define coefficient of static friction.



[Watch Video Solution](#)

**42.** Define angle of friction.



[Watch Video Solution](#)

43. Draw a graph of force of friction  $\frac{v}{s}$  applied force.



[Watch Video Solution](#)

44. Define kinetic friction.



[Watch Video Solution](#)

**45.** Define coefficient of kinetic friction.



**Watch Video Solution**

**46.** What is rolling friction?



**Watch Video Solution**

**47.** Define coefficient of rolling friction.



**Watch Video Solution**

## Two Mark Question

1. What information do we get from Newton's *III* law of motion. Give an example.



[Watch Video Solution](#)

2. Define spring constant. What does the negative sign in the expression indicate?



[Watch Video Solution](#)

3. A person falling on a pile of sponge beds does not get hurt. Explain why?



[Watch Video Solution](#)

4. An athlete takes a long run before the jump. Explain why?



[Watch Video Solution](#)

5. A gun recoils when the a bullet is fired from it. Explain why?



[Watch Video Solution](#)

6. What is meant by angle of contact?

Represent the angle of contact with a neat labelled diagram.



[Watch Video Solution](#)

7. Draw a neat labelled diagram to represent the angle of repose.



[Watch Video Solution](#)

**8.** Can Newton's law be applied for a variable mass? Give an example.



**Watch Video Solution**

**9.** Distinguish between impulse and impulsive force.



**Watch Video Solution**

**10.** Give any two examples of reducing the impulse.



**Watch Video Solution**

**11.** Give any two examples for contact forces.



**Watch Video Solution**

**12.** Relate coefficient of limiting friction with the angle of repose.





[Watch Video Solution](#)

**13.** Give any two evils (disadvantages ) of friction.



[Watch Video Solution](#)

**14.** Given any two advantages of friction.



[Watch Video Solution](#)

**15.** Mention any two methods of reducing friction .



**Watch Video Solution**

**16.** State the laws of friction.



**Watch Video Solution**

**Three Mark Question**

1. State and explain Newton's first law of motion.



[Watch Video Solution](#)

2. State and explain Newton's *II* law of motion

.



[Watch Video Solution](#)

3. State and explain Newton's *III* law of motion ?



[Watch Video Solution](#)

4. Distinguish between inertial and non-inertial frames of reference.



[Watch Video Solution](#)

5. Distinguish between mass and weight.



[Watch Video Solution](#)

6. Explain the law of conservation of linear momentum with examples.



[Watch Video Solution](#)

7. Is static force a self adjusting force?



[Watch Video Solution](#)

1. Derive  $\vec{F} = m \vec{a}$  where the symbols have their usual meanings.



[Watch Video Solution](#)

2. State and prove conservation of linear momentum in case of collision of two bodies.



[Watch Video Solution](#)

3. State the laws of friction.



[Watch Video Solution](#)

4. Mention any two methods of reducing friction .



[Watch Video Solution](#)

**Numericals With Solutions**

1. A force of  $100N$  acts on a body of mass  $0.25kg$  for  $2s$ . Calculate acceleration of the body and its change in momentum.



Watch Video Solution

2. A driver of a car driving at  $72kmph$  notices a child on the road at a distance of  $50m$ . If the weight of the car including the driver is  $750kg$  wt then calculate the resistive force applied on



the wheels by the brakes, if the car, comes to stop just in front of the child.



[Watch Video Solution](#)

**3.** Calculate the force required to stop a ship of mass  $5 \times 10^6 \text{ kg}$  moving at  $40 \text{ kmph}$  in a time interval of 10 minute. How far will it travel before coming to rest. (Neglect water resistance).



[Watch Video Solution](#)

4. A gun of mass  $20\text{kg}$  fires a bullet of mass  $0.010\text{kg}$  in a horizontal direction. If the gun recoils at  $0.05\text{ms}^{-1}$ , then calculate the velocity of the bullet. If the gun has to be stopped within a period of  $0.1\text{s}$  then what force should be exerted on the gun?



[Watch Video Solution](#)

5. A helicopter of mass  $1000\text{kg}$  rises with vertical acceleration of  $15\text{ms}^{-2}$ . The crew and passengers together weigh  $300\text{kg}$ . Give the

magnitude and direction of

(a) force on floor by the crew and passengers.

(b) action on the rotor of the helicopter on the surrounding air.

(c) force on the helicopter due to the surrounding ( $g = 10 \text{ Nms}^{-2}$ )



**Watch Video Solution**

**6.** A monkey of mass  $40 \text{ kg}$  climbs on a rope which can stand a maximum tension of  $600 \text{ N}$ . In which of the following cases will the rope

break ? The monkey

(a) climbs up with acceleration of  $6ms^{-2}$  .

(b) climbs down with acceleration of  $4ms^{-2}$

(c) climbs up with uniform speed of  $5ms^{-1}$

(d) falls down the rope nearly freely under gravity ( $g = 10ms^{-2}$ ).



**Watch Video Solution**

7. A bombshell of mass explodes such that the broken masses are in the ratio 1:1:3. The ratio two pieces of equal mass fly with the

same speed at right angles to each other with a velocity of  $100\text{ms}^{-1}$ . Find the direction and velocity of the third fragment of the shell. What will be the total kinetic energy of the fragments.



[Watch Video Solution](#)

**8.** Two railway wagons weighing  $5000\text{kg}$  and  $7500\text{kg}$  are moving at  $10\text{ms}^{-1}$  and  $2\text{ms}^{-1}$  in the same direction. After collision they stick together and move with the same velocity.

Find the common speed and direction of motion.



**Watch Video Solution**

**9.** A bomb shell of mass  $100\text{kg}$  travelling at  $500\text{m s}^{-1}$  explodes into two fragments of masses in the ratio 2:3. The smaller one flies at an angle of  $45^\circ$  and the heavier at  $60^\circ$  with respect to the  $X$ -axis in the  $(x, y)$  and  $(x, -y)$  planes respectively. Calculate their velocities.



Watch Video Solution

**10.** A car is moving at  $72\text{kmph}$ . Brakes are suddenly applied causing all the tyres to skid. How far will the car move before coming to a stop (given  $g = 9.8\text{ms}^{-2}$  and  $\mu = 0.2$ )?



Watch Video Solution

**11.** An aeroplane clears the runway path of  $300\text{m}$  with a final take off speed of  $234\text{kmph}$ . If the total mass of the plane is  $50000\text{kg}$  and

friction between the wheels and the road is 0.4, then calculate the thrust on the engine ( $g = 10ms^{-2}$ ).



**Watch Video Solution**

**12.** A wooden block is pressed on a wall. The coefficient of friction between the wall and wood is 0.35. If the mass of the wood is  $1kg$  then calculate the force of reaction required to hold the block on the wall which just causes sliding. ( $g = 9.8ms^{-2}$ ).





Watch Video Solution

13. Two blocks  $m_1 = 1kg$ ,  $m_2 = 2kg$  are placed one upon the other.  $m_1$  is kept on  $m_2$ . The force of static friction between  $m_1$  and  $m_2$  is 0.2 and between  $m_2$  and the horizontal surface and the floor is 0.28. Calculate the maximum force that can be applied on  $m_2$  so that  $m_1$  and  $m_2$  does not get separated. ( $g = 10ms^{-2}$ )



Watch Video Solution

**14.** A block slides down a rough inclined plane of inclination  $45^\circ$ . If the coefficient of kinetic friction is 0.5, find the acceleration of the sliding block. ( $g = 10\text{ms}^{-2}$ ).



[Watch Video Solution](#)

**15.** A force of  $56.6\text{N}$  is sufficient to pull a block of wood of mass  $10\text{kg}$  on a horizontal surface. Calculate the angle of friction.



[Watch Video Solution](#)

