JEE | NEET

PragatiVeer

The Personal Exam Coach

Physics

PV-DPS-PHY-188

Daily Practice Sheet

Class XI | Chapter 4: Laws of Motion

Released: 07 July 2026

15 Questions · **45 minutes** · **60 Marks**

Prepared with ❄ by **Mr. Ram Sir**

Daily Practice Sheet

Physics | Class XI | Chapter 4: Laws of Motion

PV-DPS-PHY-188 | Released: 07 July 2026

Total Questions	**15**	**Time Allowed**	**45 minutes**
Maximum Marks	**60**	**Difficulty**	**Easy / Medium / Hard**

Instructions

1. All questions are compulsory.
2. Each question carries **4 marks**.
3. There is **no negative marking**.
4. Write the final answer in the space provided or mark the correct option.
5. Time: **45 minutes**.

Questions

1. **A body of mass 5 kg is acted upon by two perpendicular forces of 8 N and 6 N. Find:**

   (i) The magnitude and direction of the resultant acceleration

   (ii) The distance travelled by the body in 10 s starting from rest

   (iii) The work done by the resultant force in 10 s

2. **A 50 g bullet is fired from a 5 kg gun with a velocity of 400 m/s. Find:**

   (i) The recoil velocity of the gun

   (ii) The impulse imparted to the gun

   (iii) The force exerted on the gun if the bullet takes 0.01 s to travel through the barrel

3. **A block of mass 2 kg is placed on a rough horizontal surface with coefficient of friction $\mu = 0.4$. A horizontal force F is applied. Taking $g = 10$ m/s^2, find:**

(i) The maximum static friction force

(ii) The acceleration of the block when $F = 6$ N

(iii) The acceleration of the block when $F = 10$ N

4. A 10 kg block is placed on a 30° inclined plane with coefficient of friction $\mu = 0.5$. Find:

(i) The component of weight parallel to the incline

(ii) The friction force acting on the block

(iii) Whether the block slides down and if so, its acceleration

5. Two blocks of masses 4 kg and 6 kg are connected by a light string passing over a frictionless pulley. Find:

(i) The acceleration of the system

(ii) The tension in the string

(iii) The force on the pulley support

6. A car of mass 1000 kg moves on a circular track of radius 50 m at a speed of 20 m/s. Find:

(i) The centripetal force required

(ii) The minimum coefficient of friction needed to prevent skidding

(iii) The banking angle required if no friction is used

7. A ball of mass 0.5 kg moving with a velocity of 10 m/s strikes a wall normally and rebounds with the same speed. Find:

(i) The change in momentum of the ball

(ii) The impulse imparted to the wall

(iii) The average force on the wall if the contact time is 0.1 s

8. State and explain Newton's three laws of motion. Give one example of each.

(i) Newton's First Law (Law of Inertia) with example

(ii) Newton's Second Law ($F = ma$) with example

(iii) Newton's Third Law (Action-Reaction) with example

9. A 3 kg block and a 2 kg block are placed in contact on a smooth horizontal surface. A horizontal force of 15 N is applied on the 3 kg block. Find:

(i) The acceleration of the system

(ii) The contact force between the two blocks

(iii) The net force on each block

10. A body of mass m is suspended by two strings making angles α and β with the horizontal. Find:

(i) The tension in each string in terms of m, g, α, β

(ii) The special case when $\alpha = \beta = 30^\circ$

(iii) The tension when $\alpha = \beta = 60^\circ$ and $m = 2$ kg

11. A block of mass m is placed on a horizontal turntable at a distance r from the centre. The turntable rotates with angular speed ω. Find:

(i) The centripetal force required to keep the block on the table

(ii) The maximum angular speed so that the block does not slip if μ is the coefficient of friction

(iii) If $r = 0.2$ m, $\mu = 0.5$, and $g = 10$ m/s^2, find the maximum ω

12. A rocket of mass 5000 kg is to be launched vertically. The exhaust gases are ejected at a rate of 50 kg/s with a speed of 2000 m/s relative to the rocket. Find:

(i) The thrust force on the rocket

(ii) The initial acceleration of the rocket

(iii) The net force on the rocket after 20 s (assuming constant exhaust rate)

13. A block of mass m is placed on a smooth inclined plane of angle θ which is itself placed on a smooth horizontal surface. Find:

(i) The acceleration of the block relative to the incline

(ii) The acceleration of the incline

(iii) The condition for the block to remain stationary relative to the incline

14. A cricket ball of mass 150 **g moving at** 30 **m/s is hit by a bat and returns along the same line at** 40 **m/s. The contact time is** 0.02 **s. Find:**

(i) The impulse imparted to the ball

(ii) The average force exerted by the bat on the ball

(iii) The acceleration of the ball during contact

15. A body of mass 2 **kg is moving with velocity** $\vec{v} = 3\hat{i} + 4\hat{j}$ **m/s. A constant force** $\vec{F} = 2\hat{i} - \hat{j}$ **N acts on it for** 5 **s. Find:**

(i) The change in momentum of the body

(ii) The final velocity of the body

(iii) The magnitude of the impulse imparted

PRAGATIVEER
Learn. Grow. Conquer.

Unlock Your Full Potential!

Go beyond the DPS — get a **personalised exam coach** in your pocket

Personalised Study Timetable
AI weekly plan targeting your weak areas

Weak-Area Tracking
Every DPS adapts to target YOUR weak topics

Streak System & Badges
Stay consistent. Earn badges. Beat your streak!

Weekly Progress Reports
Track your improvement week over week

Private AI Tutor Channel
Your own channel. Ask doubts. Get instant help.

Peer Leaderboard
Compete anonymously. Know where you stand!

PragatiVeer Pro

just **Rs. 2,499/yr**

Join PragatiVeer on Discord FREE!

Start with FREE DPS | No sign-up required | Upgrade anytime

PRAGATIVEER
Learn. Grow. Conquer.

Answer Key

Q. No.	Answer
1	(i) $F_{\text{net}} = \sqrt{8^2+6^2} = 10$ N, $a = \frac{F}{m} = \frac{10}{5} = 2$ m/s^2, direction $\theta = \tan^{-1}(6/8) = \tan^{-1}(3/4)$ from the 8 N force; (ii) $s = \frac{1}{2}at^2 = \frac{1}{2}(2)(100) = 100$ m; (iii) $W = Fs = 10 \times 100 = 1000$ J
2	(i) By conservation of momentum: $0 = 5v_g + 0.05(400) \Rightarrow v_g = -4$ m/s (recoil); (ii) Impulse $= \Delta p = 5(4) = 20$ N·s; (iii) $F = \frac{\Delta p}{\Delta t} = \frac{20}{0.01} = 2000$ N
3	(i) $f_{\max} = \mu mg = 0.4(2)(10) = 8$ N; (ii) $F = 6$ N $< f_{\max}$, so $a = 0$; (iii) $F = 10$ N $> f_{\max}$, $F_{\text{net}} = 10 - 8 = 2$ N, $a = \frac{2}{2} = 1$ m/s^2
4	(i) $mg\sin 30^\circ = 10(10)(1/2) = 50$ N; (ii) $f_{\max} = \mu mg\cos 30^\circ = 0.5(10)(10)(\sqrt{3}/2) = 25\sqrt{3} \approx 43.3$ N; (iii) $mg\sin 30^\circ = 50$ N $> f_{\max} = 43.3$ N, so block slides; $a = \frac{50-43.3}{10} = 0.67$ m/s^2
5	(i) $a = \frac{(m_2-m_1)g}{m_1+m_2} = \frac{(6-4)(10)}{10} = 2$ m/s^2; (ii) $T = m_1(g+a) = 4(12) = 48$ N (or $T = m_2(g-a) = 6(8) = 48$ N); (iii) Force on support $= 2T = 96$ N
6	(i) $F_c = \frac{mv^2}{r} = \frac{1000(400)}{50} = 8000$ N; (ii) $\mu mg = F_c \Rightarrow \mu = \frac{F_c}{mg} = \frac{8000}{10000} = 0.8$; (iii) $\tan\theta = \frac{v^2}{rg} = \frac{400}{50(10)} = 0.8 \Rightarrow \theta = \tan^{-1}(0.8) \approx 38.66^\circ$
7	(i) $\Delta p = mv_f - mv_i = 0.5(-10) - 0.5(10) = -10$ kg·m/s (magnitude 10 kg·m/s); (ii) Impulse on wall $= 10$ N·s; (iii) $F = \frac{\Delta p}{\Delta t} = \frac{10}{0.1} = 100$ N
8	(i) First Law: A body at rest stays at rest, a body in motion stays in uniform motion unless acted upon by an external force. E.g., a book on a table remains at rest until pushed; (ii) Second Law: $\vec{F} = m\vec{a}$. E.g., pushing a cart harder gives greater acceleration; (iii) Third Law: Every action has an equal and opposite reaction. E.g., a gun recoils when a bullet is fired
9	(i) $a = \frac{F}{m_1+m_2} = \frac{15}{5} = 3$ m/s^2; (ii) Contact force $F_c = m_2 a = 2(3) = 6$ N; (iii) Net force on 3 kg block $= 15 - 6 = 9$ N, net force on 2 kg block $= 6$ N
10	(i) $T_1\cos\alpha + T_2\cos\beta = mg$, $T_1\sin\alpha = T_2\sin\beta$; Solving: $T_1 = \frac{mg\cos\beta}{\sin(\alpha+\beta)}$,

Unlock Your Full Potential!

Go beyond the DPS — get a **personalised exam coach** in your pocket

Personalised Study Timetable
AI weekly plan targeting your weak areas

Weak-Area Tracking
Every DPS adapts to target YOUR weak topics

Streak System & Badges
Stay consistent. Earn badges. Beat your streak!

Weekly Progress Reports
Track your improvement week over week

Private AI Tutor Channel
Your own channel. Ask doubts. Get instant help.

Peer Leaderboard
Compete anonymously. Know where you stand!

PragatiVeer Pro

just **Rs. 2,499/yr**

Join PragatiVeer on Discord FREE!

Start with FREE DPS | No sign-up required | Upgrade anytime