

CHAPTER-4 | Laws of Motion

QUIZ-01

1. What is the direction of the frictional force when a car moves in a circle on a level road?
- Outward from the center of the circle
 - Along the direction of motion
 - Toward the center of the circle
 - Opposite to the direction of motion

(C)

Explanation: The frictional force provides the necessary centripetal force and acts toward the center of the circular path.

2. A bullet of mass 0.04 kg is stopped by a wooden block in 0.6 m. If the bullet was moving at 90 m/s, what is the average resistive force?

- 180 N
- 225 N
- 270 N
- 300 N

(C)

Explanation: Using the equation $a = -u^2/2s$, the deceleration is 6750 m/s^2 . So, force = $0.04 \times 6750 = 270 \text{ N}$.

3. What kind of force is responsible for a body to roll without slipping on a surface?

- Static friction
- Kinetic friction
- Spring force
- Normal reaction

(A)

Explanation: Rolling without slipping implies no relative motion at the point of contact, so static friction acts to prevent slipping.

4. Which of the following correctly represents Newton's second law in vector form?

- $F = m v$
- $F = dp/dt$
- $F = m g$
- $F = da/dt$

(B)

Explanation: Newton's second law states that force is the rate of change of momentum, i.e., $F = dp/dt$.

5. A cyclist takes a circular turn of radius 3 m at 18 km/h. If the coefficient of static friction is 0.1, will he slip?

- No, because friction is sufficient
- Yes, because speed is high
- No, because normal force supports motion
- Yes, because mass is large

(B)

Explanation: The required centripetal acceleration exceeds what friction can provide. Thus, the cyclist will slip.

6. What is the unit of impulse in SI?

- kg m/s^2
- $\text{kg m}^2/\text{s}^2$
- N s
- J s

(C)

Explanation: Impulse = Force \times Time = $\text{N} \times \text{s}$, so its unit is N's (newton-second).

7. A block is placed on an inclined plane. It starts to slide at 15° . What is the coefficient of static friction?

- 0.15
- 0.25
- 0.27
- 0.30

(C)

Explanation: When sliding begins, $\mu_s = \tan(\theta) = \tan(15^\circ) \approx 0.27$.

8. If net external force on a body is zero, its acceleration is :

- Increasing
- Constant
- Zero
- Variable

(C)

Explanation: Newton's first law implies zero net external force leads to zero acceleration.

9. What is the restoring force in a stretched string called?

- Friction
- Normal reaction
- Tension
- Impulse

(C)

Explanation: In a stretched string, the restoring force is called tension and acts along the string's length.

10. Which of the following is not a contact force?

- Tension
- Gravity
- Friction
- Normal force

(B)

Explanation: Gravity is a non-contact force, while the rest require physical contact.