

CHAPTER-4 | Laws of Motion

QUIZ
PART-04

1. When a lift moves upward with acceleration (a), the reaction force on a person of mass(m) is:
- mg
 - $m(g-a)$
 - $m(g+a)$
 - Zero

(C)

Explanation : In upward acceleration, the apparent weight increases as $R = m(g+a)$.

2. The force that resists relative motion between two bodies in contact is called:
- Normal force
 - Frictional force
 - Tension
 - Spring force

(B)

Explanation : Friction always acts opposite to relative motion between surfaces.

3. Which of the following is true about limiting friction?
- Depends on the area of contact
 - Independent of the nature of surfaces
 - Proportional to normal reaction
 - Acts in the direction of motion

(C)

Explanation : Limiting friction follows $f_s = \mu_s R$, directly proportional to the normal force.

4. If a lift is in free fall, the apparent weight of a body inside is:
- mg
 - Zero
 - $m(g+a)$
 - $m(g-a)$

(B)

Explanation : In free fall, reaction force vanishes and weightlessness occurs.

5. The coefficient of static friction (μ_s) is equal to:
- $\tan \theta$ (angle of repose)
 - $\sin \theta$
 - $\cos \theta$
 - $\cot \theta$

(A)

Explanation : At the angle of repose, $\tan \theta = \mu_s$.

6. Which type of friction is the smallest in magnitude?
- Rolling friction
 - Sliding friction
 - Kinetic friction
 - Static friction

(A)

Explanation : The hierarchy is Rolling < Kinetic < Sliding friction.

7. When two surfaces just begin to slide over each other, the frictional force acting is:
- Static friction
 - Kinetic friction
 - Limiting friction
 - Rolling friction

(C)

Explanation : Limiting friction is the maximum static friction, just before motion begins.

8. Which factor does not affect the limiting friction between two surfaces?
- Nature of surfaces
 - Normal reaction force
 - Area of contact
 - Coefficient of friction

(C)

Explanation : Friction is independent of the area of contact.

9. The reaction force exerted by a table on a block resting on it is directed:
- Downward by the table
 - Upward by the table
 - Downward by the block
 - Horizontal

(B)

Explanation : The normal reaction always acts perpendicular to the surface, upward here.

10. For a body on an inclined plane just at rest, the angle of repose is:
- Equal to the angle of friction
 - Greater than the angle of friction
 - Less than the angle of friction
 - Independent of friction

(A)

Explanation : The condition gives $\theta = \lambda$, where θ is angle of repose and λ angle of friction.