Laws of Motion Formulas

ChatGPT said:

MCQs on Laws of Motion, Friction, Circular Motion, and Banking of Curves

1. Newton's First Law is also known as:

A) Law of Acceleration
B) Law of Inertia
C) Law of Force
D) Law of Reaction

2. The unit of force in the SI system is:

A) Joule
B) Pascal
C) Newton
D) Watt

3. Which of the following quantities is a vector?

A) Mass
B) Time
C) Force
D) Energy

4. Newton's Third Law of Motion states that:

A) Every action has an equal and opposite reaction
B) Force equals mass times acceleration
C) Energy can neither be created nor destroyed
D) The acceleration of an object is inversely proportional to its mass

5. Which of the following forces opposes the motion of an object?

A) Tension
B) Gravitational force
C) Friction
D) Centripetal force

6. Centripetal force always acts:

A) Tangentially to the path
B) Towards the center of the circular path

C) Away from the center of the circular path
D) Perpendicular to the velocity

7. The formula for centripetal acceleration is:

A) $a_c = \frac{v^2}{r}$
B) $a_c = \frac{v}{r}$
C) $a_c = r\omega^2$
D) Both A and C

8. The maximum speed at which a vehicle can take a banked curve without friction is given by:

A) $v = \sqrt{rg \sin \theta}$
B) $v = \sqrt{rg \cos \theta}$
C) $v = \sqrt{rg \tan \theta}$
D) $v = \frac{rg}{\tan \theta}$

9. The force of static friction depends on:

A) The area of contact
B) The mass of the object
C) The normal force
D) The velocity of the object

10. In uniform circular motion, the direction of velocity is:

A) Constant
B) Along the radius
C) Along the tangent to the circular path
D) Along the centripetal force

11. The frictional force acting on an object moving at constant velocity is:

A) Equal to zero
B) Equal to the applied force
C) Greater than the applied force
D) Less than the applied force

12. The maximum speed for a vehicle to safely negotiate a flat curve without skidding depends on:

A) Coefficient of static friction
B) Coefficient of kinetic friction
C) Coefficient of rolling friction
D) Gravitational force only

13. When a car moves on a banked curve, the normal reaction provides:

A) Only the centripetal force
B) Only the weight
C) Both centripetal force and weight
D) None of the above

14. When an object moves in a circle at constant speed, its acceleration:

A) Is zero
B) Is tangential to the path
C) Is directed radially inward
D) Is directed radially outward

15. If a car is negotiating a curve of radius r with velocity v, the frictional force between the tires and the road is:

A) $\frac{mv^2}{r}$
B) μmg
C) $\mu \frac{mv^2}{r}$
D) mg

Answer Key:

1. B
2. C
3. C
4. A
5. C
6. B
7. D
8. C
9. C
10. C
11. B
12. A
13. C
14. C
15. A