SET 1 – LAWS OF MOTION (Q1–Q50)

Q1. Who among the following first pointed out the flaw in Aristotle's theory of motion?
a) Archimedes
b) Galileo
c) Newton
d) Kepler
Ans: b) Galileo

Q2. The property of a body due to which it resists a change in its state of rest or motion is called:
a) Momentum
b) Inertia
c) Force
d) Impulse
Ans: b) Inertia

Q3. Newton's First Law is also known as:
a) Law of conservation of energy
b) Law of inertia
c) Law of gravitation
d) Law of momentum
Ans: b) Law of inertia

Q4. Which of the following quantities remains constant in uniform circular motion?
a) Velocity
b) Speed
c) Momentum
d) Acceleration
Ans: b) Speed

Q5. Force is the rate of change of:
a) Energy

b) Acceleration
c) Momentum
d) Inertia
Ans: c) Momentum

Q6. The SI unit of force is:
a) Joule
b) Newton
c) Dyne
d) Watt
Ans: b) Newton

Q7. If net external force on a body is zero, its acceleration will be:
a) Zero
b) Constant
c) Increasing
d) Decreasing
Ans: a) Zero

Q8. Momentum is a _____ quantity.
a) Scalar
b) Vector
c) Dimensionless
d) None
Ans: b) Vector

Q9. Which of the following is a contact force?
a) Gravitational force
b) Magnetic force
c) Friction
d) Electrostatic force
Ans: c) Friction

Q10. Friction is caused by:
a) Gravity
b) Interlocking of irregularities

c) Weight
d) Normal reaction
Ans: b) Interlocking of irregularities

Q11. The unit of momentum is:
a) kg m/s
b) kg m/s²
c) Joule
d) Watt
Ans: a) kg m/s

Q12. If a force of 10 N acts on a mass of 2 kg, acceleration is:
a) 2 m/s²
b) 5 m/s²
c) 10 m/s²
d) 20 m/s²
Ans: b) 5 m/s²

Q13. A cricket player lowers his hands while catching a ball to:
a) Decrease impulse
b) Decrease momentum
c) Increase time of impact
d) Increase force
Ans: c) Increase time of impact

Q14. Impulse is equal to:
a) Force × velocity
b) Force × time
c) Mass × acceleration
d) Pressure × area
Ans: b) Force × time

Q15. The rate of change of momentum is numerically equal to:
a) Acceleration
b) Impulse
c) Force

d) Mass
Ans: c) Force

Q16. Which law of motion explains recoil of a gun?
a) First law
b) Second law
c) Third law
d) Conservation of energy
Ans: c) Third law

Q17. Frictional force always acts:
a) In the direction of motion
b) Opposite to motion
c) At an angle to motion
d) None
Ans: b) Opposite to motion

Q18. Which type of friction is generally maximum?
a) Rolling friction
b) Sliding friction
c) Static friction
d) Kinetic friction
Ans: c) Static friction

Q19. The maximum speed of a car on a circular track without slipping depends on:
a) Mass of car
b) Radius and coefficient of friction
c) Speed only
d) Acceleration due to gravity only
Ans: b) Radius and coefficient of friction

Q20. Inertia of a body depends on its:
a) Speed
b) Mass
c) Velocity

d) Momentum
Ans: b) Mass

Q21. Newton's Second Law gives the definition of:
a) Work
b) Energy
c) Force
d) Impulse
Ans: c) Force

Q22. The opposing force in fluids is called:
a) Normal reaction
b) Friction
c) Viscous force
d) Elastic force
Ans: c) Viscous force

Q23. Which of the following is not a fundamental force in nature?
a) Gravitational
b) Electromagnetic
c) Nuclear
d) Friction
Ans: d) Friction

Q24. A body of mass 5 kg is moving with velocity 10 m/s. Its momentum is:
a) 5 kg m/s
b) 10 kg m/s
c) 50 kg m/s
d) 100 kg m/s
Ans: c) 50 kg m/s

Q25. A passenger standing in a bus is thrown forward when the bus suddenly stops because of:
a) Law of inertia
b) Law of gravitation
c) Conservation of energy

d) None
Ans: a) Law of inertia

Q26. Which law of motion defines force as the rate of change of momentum?
a) First law
b) Second law
c) Third law
d) Law of gravitation
Ans: b) Second law

Q27. A man jumps out of a moving boat. The boat moves backwards because of:
a) Law of inertia
b) Conservation of momentum
c) Friction
d) Buoyant force
Ans: b) Conservation of momentum

Q28. The tendency of a body to continue moving in a straight line at constant speed is due to:
a) Momentum
b) Force
c) Inertia
d) Energy
Ans: c) Inertia

Q29. Which law of motion explains why we feel a jerk when a bus suddenly starts?
a) First law
b) Second law
c) Third law
d) Law of gravitation
Ans: a) First law

Q30. When a ball hits a wall and bounces back, which law is involved?
a) Law of inertia
b) Law of gravitation
c) Newton's Third Law
d) Conservation of energy
Ans: c) Newton's Third Law

Q31. Which force is responsible for circular motion of planets around the sun?
a) Tension
b) Friction
c) Gravitational force
d) Centrifugal force
Ans: c) Gravitational force

Q32. If a body is in equilibrium, the net external force acting on it is:
a) Maximum
b) Zero
c) Infinite
d) Equal to mass × acceleration
Ans: b) Zero

Q33. The product of mass and acceleration is:
a) Work
b) Force
c) Impulse
d) Momentum
Ans: b) Force

Q34. A stone tied to a string and whirled in a horizontal circle is acted upon by:
a) Centrifugal force
b) Centripetal force
c) Normal force
d) Frictional force
Ans: b) Centripetal force

Q35. Unit of impulse is the same as that of:
a) Force
b) Momentum
c) Acceleration
d) Energy
Ans: b) Momentum

Q36. A body continues to fall freely towards earth until:
a) Force becomes zero
b) Acceleration becomes zero
c) Velocity becomes zero
d) Air resistance balances weight
Ans: d) Air resistance balances weight

Q37. The maximum value of static friction is known as:
a) Rolling friction
b) Limiting friction
c) Kinetic friction
d) None
Ans: b) Limiting friction

Q38. The angle of repose is equal to:
a) $\sin^{-1}(\mu k)$
b) $\cos^{-1}(\mu k)$
c) $\tan^{-1}(\mu s)$
d) $\tan^{-1}(\mu k)$
Ans: c) $\tan^{-1}(\mu s)$

Q39. A car moving with constant velocity on a straight road is in:
a) Accelerated motion
b) Non-equilibrium
c) Equilibrium
d) Rotational motion
Ans: c) Equilibrium

Q40. A block of 2 kg is acted upon by a force of 10 N. Its acceleration is:
a) 5 m/s²
b) 10 m/s²
c) 20 m/s²
d) 2 m/s²
Ans: a) 5 m/s²

Q41. The centripetal force on a body of mass m moving with velocity v in a circle of radius r is:
a) mv^2/r
b) mv/r^2
c) mr/v^2
d) v^2/r
Ans: a) mv^2/r

Q42. The reaction force of the earth's pull on a body is exerted by the body on:
a) The moon
b) The atmosphere
c) The earth
d) None
Ans: c) The earth

Q43. The force which prevents a body from sliding down on an inclined plane is:
a) Normal force
b) Friction
c) Weight
d) Centripetal force
Ans: b) Friction

Q44. Newton's third law pairs act:
a) On the same body
b) On different bodies
c) On the environment

d) On the system only
Ans: b) On different bodies

Q45. A horse pulls a cart and the cart moves. Which force causes the cart to move forward?
a) Force by horse on cart
b) Reaction of ground on horse
c) Normal reaction
d) Weight of cart
Ans: b) Reaction of ground on horse

Q46. If a net force acts on a body, the body will always show:
a) Constant velocity
b) Acceleration
c) Equilibrium
d) Uniform motion
Ans: b) Acceleration

Q47. The momentum of an isolated system of interacting particles is:
a) Always increasing
b) Always decreasing
c) Conserved
d) Zero
Ans: c) Conserved

Q48. In rolling motion, the friction involved is mostly:
a) Static friction
b) Kinetic friction
c) Sliding friction
d) Limiting friction
Ans: a) Static friction

Q49. Which of the following reduces rolling friction?
a) Lubrication
b) Ball bearings
c) Cushion of air

d) All of these
Ans: d) All of these

Q50. A cyclist leans inward while taking a turn because:
a) To reduce friction
b) To avoid toppling
c) To increase speed
d) To reduce weight
Ans: b) To avoid toppling