SET 3 – LAWS OF MOTION (Q101–Q150)

Q101. Which physical quantity is defined as the product of mass and velocity?
a) Force
b) Momentum
c) Energy
d) Impulse
Ans: b) Momentum

Q102. A man getting off a moving bus falls forward because of:
a) Friction
b) Inertia of motion
c) Momentum
d) Acceleration
Ans: b) Inertia of motion

Q103. A body remains in uniform motion unless acted upon by:
a) Gravity
b) Net external force
c) Friction only
d) Inertia
Ans: b) Net external force

Q104. A body of mass 10 kg moving with velocity 2 m/s has kinetic energy:
a) 10 J
b) 20 J
c) 40 J
d) 50 J
Ans: b) 20 J

Q105. Which of the following is not an effect of force?
a) Change in mass
b) Change in motion
c) Change in shape

d) Change in direction
Ans: a) Change in mass

Q106. A block of mass 1 kg is acted upon by two opposite forces each of 5 N. The acceleration is:
a) Zero
b) 5 m/s²
c) 10 m/s²
d) 1 m/s²
Ans: a) Zero

Q107. The acceleration of a body on which a net force F acts is proportional to:
a) Mass
b) Velocity
c) Force
d) Momentum
Ans: c) Force

Q108. For a body moving in a circle at constant speed, which remains constant?
a) Velocity
b) Acceleration
c) Kinetic energy
d) Direction
Ans: c) Kinetic energy

Q109. A boy jumping from a slowly moving cart falls:
a) Backward
b) Forward
c) On the cart
d) None
Ans: b) Forward

Q110. A body sliding on a rough surface slows down due to:
a) Force

b) Friction
c) Inertia
d) Weight
Ans: b) Friction

Q111. The normal force acts:
a) Tangential to surface
b) Perpendicular to surface
c) Parallel to surface
d) Along gravity
Ans: b) Perpendicular to surface

Q112. Which is greater in magnitude generally?
a) Kinetic friction
b) Static friction
c) Rolling friction
d) None
Ans: b) Static friction

Q113. A body is in translational equilibrium when:
a) Net torque = 0
b) Net force = 0
c) Velocity = constant
d) Acceleration = constant
Ans: b) Net force = 0

Q114. A ball collides with wall and rebounds. Which is conserved?
a) Momentum of system
b) Momentum of ball
c) Velocity of ball
d) Kinetic energy of ball
Ans: a) Momentum of system

Q115. A person is pushed forward while alighting from a fast-moving bus due to:
a) Force

b) Inertia of rest
c) Inertia of motion
d) Momentum
Ans: c) Inertia of motion

Q116. Which one is an example of impulsive force?
a) Gravitational force
b) Collision of two billiard balls
c) Normal reaction
d) Friction
Ans: b) Collision of two billiard balls

Q117. The maximum acceleration of a train in which a box remains at rest depends on:
a) Weight of box
b) Mass of train
c) Coefficient of static friction
d) Speed of train
Ans: c) Coefficient of static friction

Q118. A cyclist takes a sharp turn without reducing speed. He slips because:
a) Inertia of rest
b) Insufficient friction
c) High velocity
d) Lack of normal force
Ans: b) Insufficient friction

Q119. Newton's First Law is applicable in:
a) Non-inertial frames only
b) Inertial frames only
c) Both inertial and non-inertial
d) None
Ans: b) Inertial frames only

Q120. A body thrown vertically upwards has zero velocity at highest point, but its acceleration is:
a) Zero
b) g downwards
c) g upwards
d) Infinity
Ans: b) g downwards

Q121. Which law is the basis of conservation of momentum?
a) First law
b) Second law
c) Third law
d) Gravitation
Ans: c) Third law

Q122. A car moves on a banked road without friction at optimum speed. The centripetal force is provided by:
a) Friction
b) Component of normal reaction
c) Weight
d) Engine force
Ans: b) Component of normal reaction

Q123. Inertia is due to:
a) Force
b) Weight
c) Mass
d) Friction
Ans: c) Mass

Q124. In equilibrium of concurrent forces, the vector sum is:
a) mg
b) Zero
c) Maximum
d) Infinite
Ans: b) Zero

Q125. The dimension of impulse is same as that of:
a) Energy
b) Force
c) Momentum
d) Work
Ans: c) Momentum

Q126. A ball is dropped from a moving train. The ball retains:
a) Only vertical velocity
b) Only horizontal velocity
c) Vertical and horizontal velocities
d) None
Ans: c) Vertical and horizontal velocities

Q127. A parachute descends slowly because of:
a) Gravity
b) Inertia
c) Air resistance
d) Friction only
Ans: c) Air resistance

Q128. Which force allows us to walk?
a) Gravity
b) Normal force
c) Friction
d) Momentum
Ans: c) Friction

Q129. For a body moving uniformly in a circle, work done by centripetal force is:
a) Maximum
b) Zero
c) Positive
d) Negative
Ans: b) Zero

Q130. If net external force is zero, momentum of system is:
a) Zero
b) Conserved
c) Maximum
d) Changing
Ans: b) Conserved

Q131. A stone tied to a string is moving in a circle. If string breaks, stone flies:
a) Towards centre
b) Along tangent
c) Away from centre
d) Downward
Ans: b) Along tangent

Q132. A car at constant speed on a rough road experiences:
a) No friction
b) Kinetic friction
c) Static friction
d) Rolling friction
Ans: b) Kinetic friction

Q133. A block of mass m slides on a rough surface with retardation a. The friction force is:
a) ma
b) mg
c) μN
d) Zero
Ans: a) ma

Q134. A boy pushes wall with force F. The wall pushes him back with:
a) Less than F
b) Greater than F
c) Equal to F
d) Zero
Ans: c) Equal to F

Q135. Action and reaction forces act:
a) On same body
b) On different bodies
c) On same point
d) Along same line always
Ans: b) On different bodies

Q136. A ball thrown on floor bounces back. Which law applies?
a) First law
b) Second law
c) Third law
d) Gravitation law
Ans: c) Third law

Q137. Which law defines inertia?
a) First
b) Second
c) Third
d) None
Ans: a) First

Q138. A 2 kg mass is acted upon by force 6 N. Its acceleration is:
a) 12 m/s²
b) 3 m/s²
c) 6 m/s²
d) 2 m/s²
Ans: b) 3 m/s²

Q139. A constant force acts on a moving body. Its velocity vs time graph will be:
a) Straight line parallel to x-axis
b) Straight line with positive slope
c) Straight line with negative slope
d) Curve
Ans: b) Straight line with positive slope

Q140. A book kept on a table exerts force equal to:
a) Its mass
b) Its volume
c) Its weight
d) Zero
Ans: c) Its weight

Q141. The net force on a body moving with uniform velocity is:
a) Zero
b) Infinity
c) Equal to momentum
d) Equal to acceleration
Ans: a) Zero

Q142. A man leans backward when starting to run because:
a) To increase speed
b) To balance reaction of ground
c) To reduce friction
d) To reduce inertia
Ans: b) To balance reaction of ground

Q143. A force of 20 N gives a body an acceleration of 2 m/s². The mass is:
a) 5 kg
b) 10 kg
c) 20 kg
d) 40 kg
Ans: b) 10 kg

Q144. Momentum is conserved in:
a) Isolated systems
b) Non-isolated systems
c) Open systems
d) Always
Ans: a) Isolated systems

Q145. The effect of rolling friction is much less than:
a) Kinetic friction
b) Sliding friction
c) Both (a) and (b)
d) Static friction
Ans: c) Both (a) and (b)

Q146. A body is said to be in equilibrium if:
a) Velocity = 0
b) Acceleration = 0
c) Net force = 0
d) Both b and c
Ans: d) Both b and c

Q147. A rocket works on principle of:
a) Conservation of energy
b) Newton's Third Law
c) Newton's First Law
d) Gravitation
Ans: b) Newton's Third Law

Q148. A boy jumping out of boat pushes it backward due to:
a) Friction
b) Inertia
c) Newton's Third Law
d) Energy
Ans: c) Newton's Third Law

Q149. A body at rest on a smooth horizontal surface will remain at rest because:
a) No unbalanced force acts
b) Its inertia is zero
c) Its weight is zero
d) None
Ans: a) No unbalanced force acts

Q150. A ball collides elastically with another at rest. The total kinetic energy is:

a) Decreased
b) Increased
c) Conserved
d) Zero

Ans: c) Conserved