1. First law of motion States that
If a body is at rest it will remain
at rest, if a body is at motion it
will remain in motion until
unless any external unbalanced
force is applied.

2. Inertia is the tendency to Oppose
the motion of the body.

3a) During the bus is moving we are also
moving when we go down from
the bus, due to Inertia of motion
we fall down.

b. We should use Seat belts because.
When the vehicle applies Suddenly
brake, our body should not
the force and object, which result
injury also.

c. While bus is moving, luggages are
also moving, sudden Suddenly
break applied, the luggages will
fall down due to inertia of rest

d. Due to Shaking of branches the
contact between the leaves and
fruits and branches become lose
due to inertia of rest and due to
gravity they fall down.

e. When a moving vihicle applies break, we fell forward jirk because, previously we are in motion when we apply brake it come into rest due to interia of motion, we fell a forward jerk.

f. While Vehicle was Stoped, we are in rest, when car Starts Suddenly, due to interia of rest we fel a backward Jerk

~~[illegible]~~

4 a) a tenis ball

b) a trock

c) A fat man

d) a five rupee coin

5. $m = 150\ g$

$= \frac{150}{1000}$

$= 0.15\ kg$

$v = 90 km/hr \times \frac{5}{18}$

$= 25\ m/s$

$P = mv$

$P = 0.15 \times 25$

$P = \frac{15}{100} \times 25$

$P = \frac{15}{4}$

$P = 3.75 \text{ kg/m/s}$

b. $m = 60 \text{ kg}$

$v = 5 \text{ m/s}$

$P = 60 \times 5$

$= 300 \text{ kg/m/s}$

7. $m_1 = 4kg$

$m_2 = 50/1000\ kg$

$u_1 = 0\ m/s$

$u_2 = 0\ m/s$

$v_2 = 35\ m/s$

$v_1 = ?$

$$m_1u_1 + m_2u_2 = m_1v_1 + m_2v_2$$

$$4 \times 0 + \frac{5}{1000} \times 0 = 4 \times v_1 + \frac{5}{1000} \times 35$$

$$-4v_1 = 0.175$$

$$-v_1 = \frac{0.175}{4}$$

$$v_1 = -0.0437\ m/s$$

Negative sign shows recoil velocity.

8. $m_1 = 10/1000$ kg

$m_2 = 6$ kg

$u_1 = 0$ m/s

$u_2 = 0$ m/s

$v_1 = 30$ m/s

$v_2 = ?$

$$m_1u_1 + m_2u_2 = m_1v_1 + m_2v_2$$

$$\frac{1}{100} \times 0 + 6 \times 0 = \frac{1}{100} \times 30 + 6v_2$$

$$0 = 0.3 + 6v_2$$

$$-6v_2 = 0.3$$

$$-v_2 = \frac{0.3}{6}$$

$$v_2 = -0.05$$

negative sign shows recoil velocity

9. $m_1 = 10/1000$ kg

$m_2 = 900/1000$ kg

$u_1 = 100$ m/s

$u_2 = 0$ m/s

$v_1 = v_2$ (common velocity)

$$m_1u_1 + m_2u_2 = m_1v_1 + m_2v_2$$

$$\frac{1}{100} \times 400 + \frac{9}{10} \times 0 = V\left(\frac{10}{100} + \frac{900}{1000}\right)$$

$$4 = \frac{9V}{100}$$

$$\frac{91}{100} V = 4 \text{ m/s}$$

$$V = 4 \times \frac{100}{91}$$

$$V = \frac{400}{91} \text{ m/s}$$

10. $m_1 = 60/1000$ kg

$m_2 = 5$ kg

$v_1 = 0$ m/s

$v_2 = 0$

$v_1 = 500$ m/s

$V_2 = ?$

$$m_1u_1 + m_2u_2 = m_1v_1 + m_2v_2$$

$$\frac{60}{1000} \times 0 + 5 \times 0 = \frac{6}{100} \times 500 + 5V_2$$

$$0 = 30 + 5V_2$$

$$-5V_2 = 30$$

$$-V_2 = 6$$

$$V_2 = -6 \text{ m/s}$$