## Perfectly Inelastic Collision

1. A particle of mass *m* moving eastward with a speed *v* collides with another particle of the same mass moving northward with the same speed *v*. The two particles coalesce on collision. The new particle of mass 2*m* will move in the north-easterly direction with a velocity
   (a) *v*/2 (b) 2*v*
   (c) $v/\sqrt{2}$ (d) *v*

2. The coefficient of restitution *e* for a perfectly inelastic collision is
   (a) 1 (b) 0
   (c) ∞ (d) – 1

3. When two bodies stick together after collision, the collision is said to be
   (a) Partially elastic
   (b) Total elastic
   (c) Total inelastic
   (d) None of the above

4. A bullet of mass *a* and velocity *b* is fired into a large block of mass *c*. The final velocity of the system is
   (a) $\frac{c}{a+b} \cdot b$ (b) $\frac{a}{a+c} \cdot b$
   (c) $\frac{a+b}{c} . a$ (d) $\frac{a+c}{a} \cdot b$

5. A mass of 10 *gm* moving with a velocity of 100 *cm*/*s* strikes a pendulum bob of mass 10 *gm*. The two masses stick together. The maximum height reached by the system now is $(g = 10m/s^2)$
   (a) Zero (b) 5 *cm*
   (c) 2.5 *cm* (d) 1.25 *cm*

6. A completely inelastic collision is one in which the two colliding particles
   (a) Are separated after collision
   (b) Remain together after collision
   (c) Split into small fragments flying in all directions
   (d) None of the above

7. A bullet hits and gets embedded in a solid block resting on a horizontal frictionless table. What is conserved?
   (a) Momentum and kinetic energy
   (b) Kinetic energy alone
   (c) Momentum alone

(d) Neither momentum nor kinetic energy

**8.** A body of mass 2 *kg* moving with a velocity of 3 *m*/*sec* collides head on with a body of mass 1 *kg* moving in opposite direction with a velocity of 4 *m*/*sec*. After collision, two bodies stick together and move with a common velocity which in *m*/*sec* is equal to

(a) 1/4 (b) 1/3

(c) 2/3 (d) 3/4

**9.** A body of mass *m* moving with a constant velocity *v* hits another body of the same mass moving with the same velocity *v* but in the opposite direction and sticks to it. The velocity of the compound body after collision is

(a) *v* (b) 2*v*

(c) Zero (d) *v*/2

**10.** In the above question, if another body is at rest, then velocity of the compound body after collision is

(a) *v*/2 (b) 2*v*

(c) *v* (d) Zero

**11.** A bag (mass *M*) hangs by a long thread and a bullet (mass *m*) comes horizontally with velocity *v* and gets caught in the bag. Then for the combined (bag + bullet) system

(a) Momentum is $\frac{mvM}{M+m}$

(b) Kinetic energy is $\frac{mv^2}{2}$

(c) Momentum is $\frac{mv(M+m)}{M}$

(d) Kinetic energy is $\frac{m^2v^2}{2(M+m)}$

**12.** A 50 *g* bullet moving with velocity 10 *m*/*s* strikes a block of mass 950 *g* at rest and gets embedded in it. The loss in kinetic energy will be

(a) 100% (b) 95%

(c) 5% (d) 50%

**13.** Two putty balls of equal mass moving with equal velocity in mutually perpendicular directions, stick together after collision. If the balls were initially moving with a velocity of $45\sqrt{2}ms^{-1}$ each, the velocity of their combined mass after collision is

(a) $45\sqrt{2}ms^{-1}$

(b) $45ms^{-1}$

(c) $90ms^{-1}$

(d) $22.5\sqrt{2}ms^{-1}$

**14.** A particle of mass *m* moving with velocity *v* strikes a stationary particle of mass 2*m* and sticks to it. The speed of the system will be

(a) $v/2$ (b) 2*v*

(c) $v/3$ (d) 3*v*

**15.** A moving body of mass *m* and velocity 3 *km*/*h* collides with a rest body of mass 2*m* and sticks to it. Now the combined mass starts to move. What will be the combined velocity

(a) 3 *km*/*h* (b) 2 *km*/*h*

(c) 1 *km*/*h* (d) 4 *km*/*h*

**16.** If a skater of weight 3 *kg* has initial speed 32 *m*/*s* and second one of weight 4 *kg* has 5 *m*/*s*. After collision, they have speed (couple) 5 *m*/*s*. Then the loss in K.E. is

(a) 48 *J*

(b) 96 *J*

(c) Zero

(d) None of these

**17.** A ball is dropped from height 10 *m*. Ball is embedded in sand 1 *m* and stops, then

(a) Only momentum remains conserved

(b) Only kinetic energy remains conserved

(c) Both momentum and K.E. are conserved

(d) Neither K.E. nor momentum is conserved

**18.** A metal ball of mass 2 *kg* moving with a velocity of 36 *km*/*h* has an head on collision with a stationary ball of mass 3 *kg*. If after the collision, the two balls move together, the loss in kinetic energy due to collision is

(a) 40 *J* (b) 60 *J*

(c) 100 *J* (d) 140 *J*

**19.** A body of mass 2*kg* is moving with velocity 10 *m*/*s* towards east. Another body of same mass and same velocity moving towards north collides with former and coalsces and moves towards north-east. Its velocity is

(a) 10 *m*/*s* (b) 5 *m*/*s*

(c) 2.5 *m*/*s* (d) $5\sqrt{2}m/s$

**20.** Which of the following is not a perfectly inelastic collision

(a) Striking of two glass balls

(b) A bullet striking a bag of sand

(c) An electron captured by a proton

(d) A man jumping onto a moving cart

**21.** A mass of 20 *kg* moving with a speed of 10*m*/*s* collides with another stationary mass of $5kg$. As a result of the collision, the two masses stick together. The kinetic energy of the composite mass will be

(a) 600 *Joule* (b) 800 *Joule*

(c) 1000 *Joule* (d) 1200 *Joule*

**22.** A neutron having mass of $1.67 \times 10^{-27}kg$ and moving at $10^{8}m/s$ collides with a deutron at rest and sticks to it. If the mass of the deutron is $3.34 \times 10^{-27}kg$ then the speed of the combination is

(a) $2.56 \times 10^{3}m/s$

(b) $2.98 \times 10^{5}m/s$

(c) $3.33 \times 10^{7}m/s$

(d) $5.01 \times 10^{9}m/s$

**23.** The quantity that is not conserved in an inelastic collision is

(a) Momentum

(b) Kinetic energy

(c) Total energy

(d) All of these

**24.** A body of mass 40*kg* having velocity 4 *m*/*s* collides with another body of mass 60*kg* having velocity 2 *m*/*s*. If the collision is inelastic, then loss in kinetic energy will be

(a) 440 *J* (b) 392 *J*

(c) 48 *J* (d) 144 *J*

**25.** A body of mass $m_1$ is moving with a velocity V. It collides with another stationary body of mass $m_2$. They get embedded. At the point of collision, the velocity of the system

(a) Increases

(b) Decreases but does not become zero

(c) Remains same

(d) Become zero

**26.** A bullet of mass *m* moving with velocity *v* strikes a block of mass *M* at rest and gets embedded into it. The kinetic energy of the composite block will be

(a) $\frac{1}{2}mv^2 \times \frac{m}{(m+M)}$

(b) $\frac{1}{2}mv^2 \times \frac{M}{(m+M)}$

(c) $\frac{1}{2}mv^2 \times \frac{(M+m)}{M}$

(d) $\frac{1}{2}Mv^2 \times \frac{m}{(m+M)}$

**27.** In an inelastic collision, what is conserved

(a) Kinetic energy

(b) Momentum

(c) Both (a) and (b)

(d) Neither (a) nor (b)

**28.** Two bodies of masses 0.1 *kg* and 0.4 *kg* move towards each other with the velocities 1 *m/s* and 0.1 *m/s* respectively, After collision they stick together. In 10 *sec* the combined mass travels

(a) 120 *m* (b) 0.12 *m*

(c) 12 *m* (d) 1.2 *m*

**29.** A body of mass 4 *kg* moving with velocity 12 *m/s* collides with another body of mass 6 *kg* at rest. If two bodies stick together after collision, then the loss of kinetic energy of system is

(a) Zero (b) 288 J

(c) 172.8 J (d) 144 J

**30.** Which of the following is not an example of perfectly inelastic collision

(a) A bullet fired into a block if bullet gets embedded into block

(b) Capture of electrons by an atom

(c) A man jumping on to a moving boat

(d) A ball bearing striking another ball bearing