

CCT Weekly Practice Science

Unit 1 :- Momentum-Impulse

During a collision, two bodies interact and exert force on each other.

According to Newton's second law, the rate of change in momentum of the body is directly proportional to the force acting on it and the change takes place in the direction of the applied force.

Mathematically,

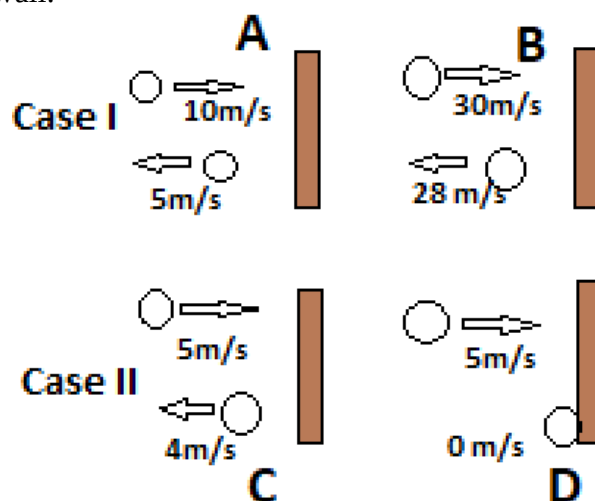
$$F_{\text{net}} = \frac{\Delta p}{\Delta t}$$

where change in momentum is also known as Impulse.

According to Newton's Third law, when two bodies collide with each other, they exert equal and opposite forces on each other.

$$F_A = -F_B$$

1. Consider collision of a tennis ball in different cases depending on different physical properties of the ball and the wall.



Which collision under the two cases has the greater Impulse?

	I	II
a)	A	C
b)	A	D
c)	B	C
d)	B	D

2. In an accident, two cars can either collide and bounce off each other on collision or collide, crumple up and travel together with the same speed after the collision. Which would be more damaging? Justify your answer.

3. Draw the force acting on cars vs time for the above two situations.

Unit 2 :- Elephants and Physics

A baby elephant was stuck in a well in Gumla district of Jharkhand. After locals alerted the state forest department, officials used a principle from physics to help the animal. The rescue team filled the well with water using motorised pipes, after which the struggling elephant floated to the top and was able to climb out through a ramp placed for it.



Image posted on Twitter by Ramesh Pandey IFS.



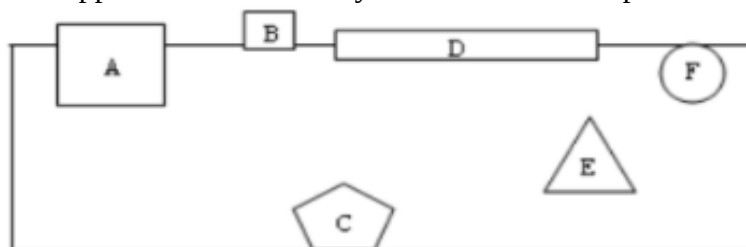
The baby elephant was stuck in a well in Gumla district. (Photo: Twitter)

Source- News article-Indian express

4. Which principle helped the officials to save the elephant? Explain how the principle helped?

5. The percentage of an iceberg (freshwater of density 0.92 g/cm^3) below the waterline in an ocean (saltwater of density 1.025 g/cm^3) will be approximately
- 20%
 - 80 %
 - 90 %
 - 10 %

6. Some objects are dropped in water and they come to rest to the positions as shown.



Arrange them in increasing order of their density

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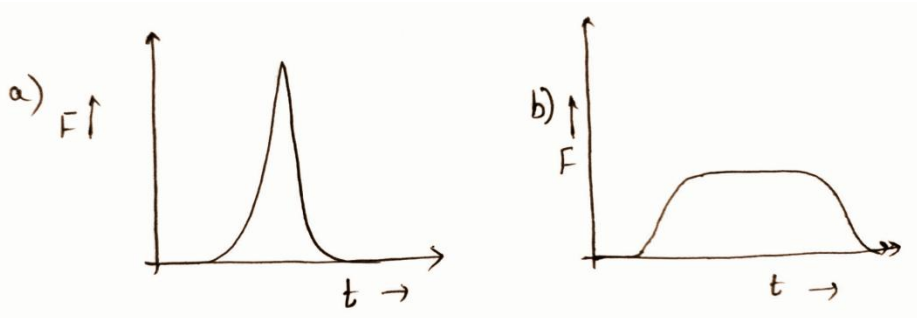
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Momentum-Impulse

Answer Key

1. c) B,C
2. Bouncing off after a collision will be more dangerous. The momentum change will be larger in less time, hence greater force will be exerted.. The crumpling up of cars is the safest type of automobile collision.
3. a) When the two cars collide and bounce off
b) When they crumple up and move together



4. Archimedes Principle, when water is pumped into the well, upthrust acts on the elephant which is greater than its weight. So, the elephant could float to the surface.
5. c) 90%
Since iceberg is in equilibrium,
 $\rho_{\text{ice}} V g = \rho_{\text{seawater}} V_{\text{submerged}} g$
 $V_{\text{submerged}} / V = \rho_{\text{ice}} / \rho_{\text{sea water}} = 90 \% \text{ (approx)}$
6. $B < D < A < F < E < C$

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