

# Free all and simultaneous vertical projection

## Questions

In ALL the questions given below “collision” is used to mean the event of *crossing over* of the bodies.

1. When the initial velocity of vertically projected body is increased what happens to the height of collision?
2. When the height of drop of freely falling body is increased what happens to the height of collision?
3. At the point of collision is speed of freely body equal to that of vertically projected body?
4. What should be the initial velocity of vertically projected body so that the bodies collide at half the height of the freely falling body?
5. From what height should the freely falling body be dropped so that the bodies collide at the highest point of the trajectory of the vertically projected body?
6. Is there a minimum velocity of projection so that the bodies collide before vertically projected body reaches the ground?
7. How does the relative velocity of A w.r.t. B during their flight (before any one of them reaches the ground)?
8. Is it possible for the vertically projected to cross over the freely falling twice in its journey?

### Note :

Questions given above may be visualized and answered using the simulations. Obtaining a mathematical solution is to be always treated as the final answer because such a mathematical solution implies that one is able to understand and apply the concept.

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