Force and Laws of Motion - Important Questions

Important Questions Notes

Force and Laws of Motion - Important Questions

1. **Using second law of motion, derive the relation between force & acceleration. A bullet of 10 g strikes a sand-bag at a speed of 1000 m/s & gets embedded after travelling 5 cm. Calculate :**
    1. **the resistive force exerted by the sand on the bullet**
    2. **the time taken by the bullet to come to rest.**
2. **A truck of mass M is moved under a force F. If the truck is then loaded with an object equal to the mass of the truck & the driving force is halved, then how does the acceleration change?**
3. **A stone of 1 kg is thrown with a velocity of 20 m/s across the frozen surface of a lake & comes to rest after travelling a distance of 50 m. What is the force of friction between the stone & the ice?**
4. **Two objects of masses 100 g & 200 g are moving along the same line & direction with velocities 2 m/s & 1 m/s respectively. They collide & after the collision, the first object moves at a velocity of 1.67 m/s. Determine the velocity of the second object.**
5. **Two objects, each of mass 1.5 kg, are moving in the same straight line but in opposite directions. The velocity of each object is 2.5 m/s before the collision during which they stick together. What will be the velocity of the combined object after collision?**
6. **A bus of mass 5000 kg starts from rest & rolls down a hill. If it travels a distance of 200 m in 10 s, calculate (i) acceleration of the bus & (ii) the force acting on the bus.**
7. **A motorcar of mass 1200 kg is moving along a straight line with a uniform velocity of 90 km/h. Its velocity is slowed down to 18 km/h in 4 s by an unbalanced external force. Calculate the acceleration & change in momentum. Also, calculate the magnitude of the force required.**
8. **An automobile vehicle has a mass of 1600 kg. What must be the force between the vehicle & road if the vehicle is to be stopped with to be a negative acceleration of 1.7 m/s^2 ?**
9. **A hockey ball of mass 250 g travelling at 10 m/s is struck by a hockey stick so as to return it along its original path with a velocity of 5 m/s. Calculate the change of momentum occurred in the motion of the hockey ball by the force applied by the hockey stick.**
10. **Two objects, each of mass 1.5 kg, are moving in the same straight line but in opposite directions. The velocity of each object is 2.5 m/s before the collision**

during which the stick together. What will be the velocity of the combined object after collision?

11. **An object of mass 100 kg is accelerated uniformly from a velocity of 5 m/s to 8 m/s in 6 s. Calculate the initial & final momentum of the object. Also, find the magnitude of the force exerted on the object.**
12. **Why does a person pull his hands backwards while catching a ball?**
13. **One hockey player has a mass of 50 kg was moving with a velocity of 5 m/s & the other player of mass 60 kg moves towards him with velocity of 6 m/s . While playing they collide & get entangled. With what velocity & in which direction will they move after collision. Ignore friction.**