Worksheet: Force and Laws of Motion

West Bengal State Board · Class 9 · Science · 15 questions · 44 marks

Name: _____ Date: _____ Score: _____ / 44

Q1. Define one newton. *[1 mark]*

Q2. What force is needed to accelerate a 2 kg object at 5 m/s²? *[1 mark]*

Q3. Find the momentum of a 60 kg cyclist moving at 5 m/s. *[1 mark]*

Q4. Why do passengers fall forward when a moving bus suddenly stops? *[2 marks]*

Q5. When you walk on the ground, identify the action-reaction force pair. *[2 marks]*

Q6. A car of mass 1000 kg accelerates from rest to 20 m/s in 10 s. Find the net force on it. *[3 marks]*

Q7. A body of mass 5 kg moving with velocity 10 m/s is brought to rest in 2 s. Find (a) the impulse, (b) the average force. *[3 marks]*

Q8. A gun of mass 4 kg fires a bullet of mass 20 g with a muzzle velocity of 300 m/s. Find the recoil velocity of the gun. *[3 marks]*

Q9. A 50 kg boy running at 4 m/s jumps onto a 200 kg cart moving in the same direction at 1 m/s. Find their common velocity after he lands (assume he sticks to the cart). *[3 marks]*

Q10. A book is at rest on a table. Identify the action-reaction pair acting between the book and the table. *[3 marks]*

Q11. A bus of mass 5000 kg moves with velocity 72 km/h. The driver applies brakes and the bus stops in 5 s. Find: (a) the deceleration, (b) the braking force. *[4 marks]*

Q12. Explain why a fast-moving cricket ball hurts more if caught with a stiff hand than if the hand is moved back during the catch. *[4 marks]*

Q13. Two blocks of masses 3 kg and 2 kg are connected by a string and placed on a frictionless horizontal surface. A force of 10 N is applied to the 3 kg block, pulling both forward. Find (a) the acceleration of the system, (b) the tension in the string. *[5 marks]*

Q14. An object of mass 1 kg moving at 10 m/s collides head-on with another stationary object of mass 4 kg. After collision, the 1 kg object moves backward at 2 m/s. Find the velocity of the 4 kg object after collision. *[5 marks]*

Q15. A rocket of mass 1000 kg is to be lifted vertically. To lift, the rocket must overcome gravity AND accelerate upward. If the upward acceleration is 5 m/s², find the thrust (force exerted by the engines). (g = 10 m/s²) *[4 marks]*