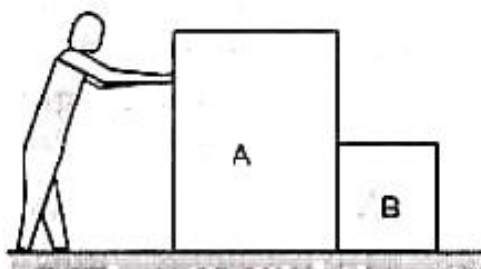


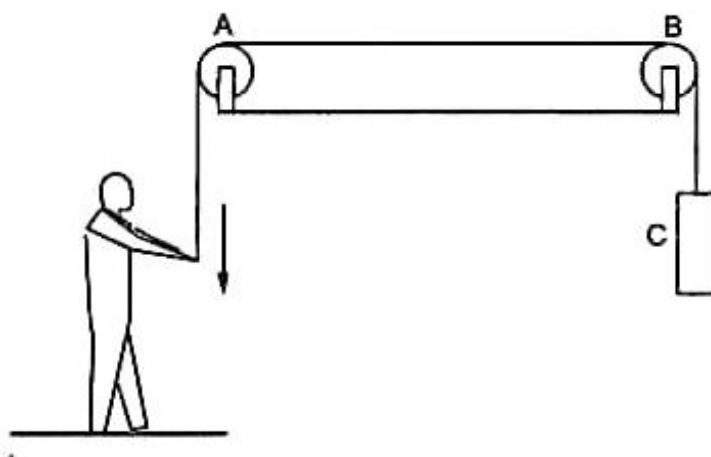
PHYSICS

DISCUSSION QUESTION

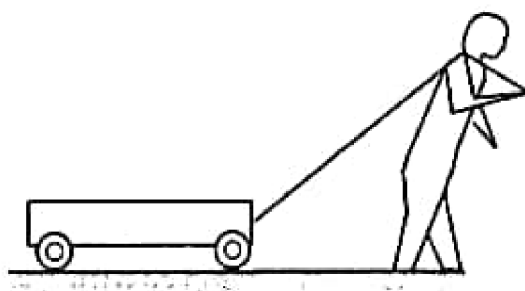
1. Is it true that the reaction of a gravitational force is always gravitational, of an electromagnetic force is always electromagnetic and so on?
2. A ball thrown straight up has zero velocity at its highest point. Is the ball in equilibrium at this point? Why or why not?
3. When a car stops suddenly, the passengers tend to move forward relative to their seats. Why? When a car makes a sharp turn, the passengers tend to slide to one side of the car. Why?
4. Some people say that the “force of inertia” (or “force of momentum”) throws the passengers forward when a car brakes sharply. What is wrong with this explanation?
5. Why is the earth only approximately an inertial reference frame?
6. Does Newton’s second law hold true for an observer in a van as it speeds up, slows down, or rounds a corner? Explain.
7. If your hands are wet and no towel is handy, you can remove some of the excess water by shaking them. Why does this get rid of the water?
8. Suppose you are in a rocket with no windows, traveling in deep space far from any other objects. Without looking outside the rocket or making any contact with the outside world, explain how you could determine if the rocket is (a) moving forward at a constant 80% of the speed of light and (b) accelerating in the forward direction.
9. List all the forces acting on the block B in figure.



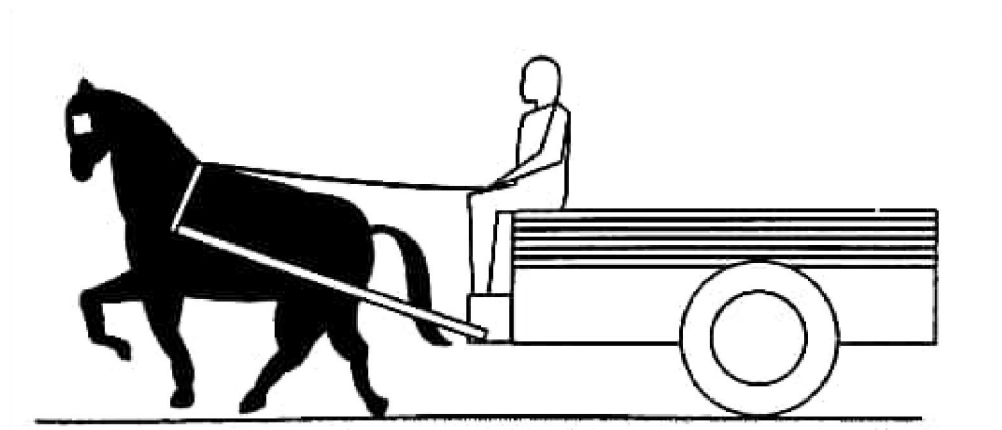
10. List all the forces acting on (a) the pulley A, (b) the boy and (c) the block C in figure.



11. Figure shows a boy pulling a wagon on a road. List as many force as you can which are relevant with this figure. Find the pairs of forces connected by Newton's third law of motion.



12. Figure shows a cart. Complete the table shown below.

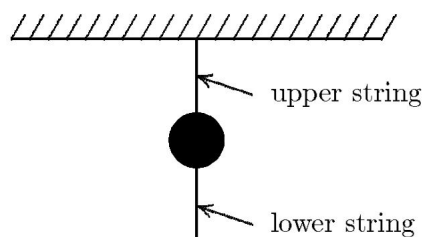


Force on	Force by	Nature of the force	Direction
Cart	1 2 3 :		
Horse	1 2 3 :		
Driver	1 2 3 :		

MCQ WITH ONE CORRECT ANSWER

1. Let E, G and N represents the magnitude of electromagnetic, gravitational and nuclear forces between two protons at a given separation (1 fermi) . Then
 (A) $N < E < G$ (B) $E > N > G$ (C) $G > N > E$ (D) $N > E > G$
2. The “reaction” force does not cancel the “action” force because :
 (A) The action force is greater than the reaction force
 (B) They are on different bodies
 (C) They are in the same direction
 (D) The reaction force exists only after the action force is removed
3. When an object is at rest
 (A) Force is required to keep it in rest state
 (B) No force is acting on it
 (C) A large number of forces may be acting on it which balance each other
 (D) It is in vacuum
4. From Newton’s second law of motion, it can be inferred that
 (A) No force is required to move a body uniformly along straight line
 (B) Accelerated motion is always due to an external force
 (C) Inertial mass of a body is equal to force required per unit acceleration in the body.
 (D) All of these
5. When an object is in equilibrium state, then
 (A) It must be at rest
 (B) No force is acting on it
 (C) Its net acceleration must be zero
 (D) All of these
6. In accordance with Newton’s third law of motion
 (A) Action and reaction never balance each other
 (B) For appearance of action and reaction, physical contact is not necessary
 (C) This law is applicable whether the bodies are at rest or they are in motion
 (D) All of these

7. A heavy ball is suspended as shown. A quick jerk on the lower string will break that string but a slow pull on the lower string will break the upper string. The first result occurs because :



- (A) The force is too small to move the ball
 (B) Action and reaction is operating
 (C) The ball has inertia
 (D) Air friction holds the ball back
8. When Neils Bohr shook hand with Werner Heisenberg, what kind of force they exerted?
 (A) Gravitational (B) Electromagnetic
 (C) Nuclear (D) Weak
9. The sum of all electromagnetic forces between different particles of a system of charged particles is zero:
 (A) only if all the particles are positively charged
 (B) only if all the particles are negatively charged
 (C) only if half the particles are positively charged and half are negatively charged
 (D) irrespective of the signs of the charges

INDIA

MCQ WITH MORE THAN ONE CORRECT ANSWER

- A neutron exerts a force on a proton which is :
(A) gravitational (B) electromagnetic
(C) nuclear (D) weak
- A proton exerts a force on a proton which is :
(A) gravitational (B) electromagnetic
(C) nuclear (D) weak
- Mark the correct statements :
(A) The nuclear force between two protons is always greater than the electromagnetic force between them.
(B) The electromagnetic force between two protons is always greater than the gravitational force between them.
(C) The gravitational force between two protons may be greater than the nuclear force between them.
(D) Electromagnetic force between two protons may be greater than the nuclear force acting between them.
- If all matter were made of electrically neutral particles such as neutrons,
(A) there would be no force of friction
(B) there would be no tension in the string
(C) it would not be possible to sit on a chair
(D) the earth could not move around the sun
- Which of the following systems may be adequately described by classical physics?
(A) motion of a cricket ball
(B) motion of a dust particle
(C) a hydrogen atom
(D) a neutron changing to a proton
- Action and reaction :
(A) act on two different objects
(B) have equal magnitude
(C) have opposite directions
(D) have resultant zero

ANSWER KEY

MCQ WITH ONE CORRECT ANSWER

1. D 2. B 3. C 4. D 5. C 6. D 7. C 8. B
9. D

MCQ WITH MORE THAN ONE CORRECT ANSWER

1. AC 2. ABC 3. BCD 4. ABC 5. AB 6. ABCD