

VAISHALI EDUCATION POINT
(QUALITY EDUCATION PROVIDER)

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FORCE AND LAWS MOTION

Class :- IX Subject :- Science Total Time :- 1 HOUR Total Marks :- 68

General Instructions

QNo.	Questions
1	Calculate force required to impart a velocity of 30m/s in 15 sec. Starting from rest. The mass of a car is 1500kg.
2	How long will it take a force of 10N to stop a mass of 2.5kg, which is moving at 20m/s.
3	A stone of mass is 20gm thrown vertically upward with speed 10m/s. Find : (a) Initial Momentum (b) Final momentum at highest point.
4	How much momentum will a ball of mass 10kg transfer to the floor. If it falls from height of 0.8m. Take $g = 10\text{m/s}^2$.
5	A car is moving with velocity 90km/hr & it takes 5sec to stop after the brakes are applied. Calculate the force exerted by the brakes on the motorcycle if its mass along with the rider is 200kg.
6	A bullet of mass 20gm is horizontally fired with a velocity 150m/s from a pistol of mass 2kg. What is the recoil velocity of the pistol?
7	A bullet of 10gm moving with a speed of 100m/s penetrates a wooden block and comes to rest in one second. Find (a) The distance through which the bullet penetrates (b) The retarding force experienced.
8	A force of 5N applied to a mass m_1 , produces an acceleration of 8m/s^2 in it and when applied to a mass m_2 produces an acceleration of 24m/s^2 in the mass. What acceleration would it produce if both the masses are tied together.
9	An object A of mass 2kg moving with a velocity of 3m/s collides head on with object B of mass 1kg moving in opposite direction with a velocity of 4m/s. After collision both bodies stuck together & move with a common velocity. Find this velocity.
10	If two masses in the ratio 3:5 are to be accelerated by force in the ratio 5:3. Find the acceleration ratio.
11	A constant retarding force of 50N is applied to a body of mass 20 kg moving initially with a speed of 15 m/s. How long does the body take to stop.
12	What is the effect of force in the following cases when –(Imp.) (a) A fielder catches a cricket ball. (b) Brakes are applied to a moving car. (c) A player hits an in-coming ball with a hockey stick. (d) A soft rubber ball is squeezed between your hands. (e) A spring is stretched. (f) A football lying on ground is kicked.
13	Identify the type of inertia in the following cases.(Imp.) (a) Falling of fruits when a branch of a tree is shaken

	(b) An athlete runs a distance before taking a leap in a high jump (c) A passenger moving forward when a train stops (d) A passenger jumping out of a moving bus falls forward if he does not run forward
14	A bullet of mass 10g moving with a velocity of 400m/s or a cricket ball of mass 400g thrown with a speed of 90Km/hr
15	A hammer of mass 500g, moving at 50m/s, strikes a nail. The nail stops the hammer in a very short time of 0.01sec. what is the force of the nail on the hammer?
16	It is difficult to balance our body when we accidentally slip on a peel of banana. Explain why?
17	(a) Explain why is it difficult to hold a hose, which ejects a large amount of water at a high velocity. (b) Why action and reaction do not cancel each other.
18	A bullet of mass 25g is fired horizontally with a velocity of 100m/s from a gun of mass 5 Kg. calculate the recoil velocity of the pistol.
19	An object experiences a net zero external unbalanced force. Is it possible for the object to be travelling with a non-zero velocity? If yes, state the conditions that must be placed on the magnitude and direction of the velocity. If no, provide a reason.
20	According to third law of motion when we push on an object, the object pushes back on us with an equal and opposite force. If the object is a massive truck parked along the road side, it will probably not move. A student justifies this by answering that the two opposite and equal force cancel each other. Comment on this logic and explain why the truck does not move.
21	Two balls A and B of masses 'm' and '2m' are in motion with velocities '2V' and 'V' respectively. Compare; (1) Their inertia (2) Their momentum and (3) Their force needed to stop them in the same time.
22	A 8000Kg engine pulls a train of 5wagons, each of 2000Kg, along a horizontal track. If the engine exerts a force of 40,000N and the track offers a friction force of 5,000N then calculate (a) The net accelerating force (b) The acceleration of the train (c) The force of the first wagon on rest of the wagons.
23	(a) Why are road accidents at high speed very much worse than accidents at low speed? (b) State the laws of motion involved in the working of a jet plane. (c) Name the physical quantity whose unit is Kgms^{-2}
24	A truck starts from rest and rolls down a hill with a constant acceleration. It travels a distance of 400m in 20 seconds. Find the acceleration. Find the force acting on it if its mass is 7 metric tonne.
25	Two objects of masses 100g and 200g are moving along the same line and direction, with velocities of 2ms^{-1} and 1ms^{-1} , respectively. They collide, and after the collision, the first object move s at a velocity of 1.67ms^{-1} . Determine the

	velocity of the second object.
26	(a) Define inertia. Name the physical quantity that measures it. (b) It is necessary to run along with the moving bus in the same direction of the bus, while alighting from bus. Give reason. (c) Calculate the magnitude of force required to produce an acceleration of 2m/s^2 in a body of mass 12.5 Kg.
27	An object of mass 200kg is accelerated uniformly from a velocity of 10m/s to 20m/s in two seconds. Calculate: (a) Initial momentum (b) Final momentum of the object (c) Magnitude of force exerted on the object. --does momentum have direction? If yes how is it specified Name two factors on which change of momentum depends.