ST. LAWRENCE HIGH SCHOOL

A JESUIT CHRISTIAN MINORITY INSTITUTION

- **Subject- Physics** **Answers of Worksheet- 5** **Class – IX**
- **Date-17.04.2020** **1st** Term
- **Topic-Numericals on laws of Motion**

Question 1.
During the game of table tennis, if the ball hits a player it does not hurt him. On the other hand when a fast moving cricket ball hits a spectator it may hurt him. State reason.
Answer

It is because of the Momentum. Table tennis ball is light than cricket ball and hence less momentum. So it hurts less to the player

Question 2.
Define the first law of motion.

Answer Any body will remain in its state of rest or motion until an external force is applied.

Question 3.
Why do a back seater moves forward when a fast moving bike is stopped suddenly?
Answer

It is because of the inertia of motion. The body is in motion so when the bike stops , back seater move forward.

Question 4.
When a carpet is beaten with a stick it releases dust. Explain why.
Answer

It is because of the inertia of rest of the dust particles .Dust particle tend to remain at rest whereas the carpet comes into motion,this causes the dust particles to fall down

Question 5.
Name the physical quantity that measures inertia. State its SI unit.
Answer

Mass is the physical quantity that measures inertia. Its unit is Kg

Question 6.
Name the property of bodies by virtue of which they resist a change in their state of rest or of uniform motion.
Answer

Mass

Question 7.
What is the momentum of a body of mass 5 kg moving with a velocity of 0.20 m/s.
Answer

$p=mv=5\times.20=1kgm/s$p=mv=5×.20=1kgm/s

Question 8.
Write the net force acting on a bus, of mass 2000 kg, moving with a uniform velocity of 60 km/h.
Answer

As acceleration is zero, Force is zero

Question 9.
State the relation between the momentum of a body and the force acting on it.
Answer p=ma = f

Force is equal to rate of change of momentum
$F=\Delta pt$F=Δpt

Question 10.
A body of mass 25 kg has a momentum of 125 kg m/s. calculate the velocity of the body.
Answer

Given m=25 kg ,p=125 kg m/s
Momentum is given by
$p=mv$p=mv
or
$v=pm=5m/s$v=pm=5m/s

Question 11.
Name the physical quantity which is measured/ determined by the rate of change of momentum.
Answer

Force

Question 12.
What is the mathematical formula and SI unit of momentum?
Answer

$p=mv$p=mv
SI unit of Momentum is kg m/s

Question 13.
What force would be needed to produce an acceleration of 4 m/s^2 on a ball of mass 6 kg?

Answer

Given m= 6 kg , a=4 m/s^2
$F=ma=6\times4=24N$F=ma=6×4=24N

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Question 14.
A bullet of 10 g strikes a sand bag at a speed of 10^3m/s and gets embedded after travelling 5 cm. Calculate
(i) the resistive force exerted by the sand on the bullet.
(ii) the time taken by the bullet to come to rest.
Answer

i. u=10^3 m/s ,v=0 ,s=5 cm= .05 m ,a=?
$v^2=u^2+2as$v2=u2+2as
a=- 10^7 m/s
Resistive force on bullet = $.001\times10^7=10^5N$.001×107=105N
ii. $v=u+at$v=u+at
t=10^4s

Question 15.
A force of 5 N produces an acceleration of 8 m/s^2on a mass m_1m1 and an acceleration of 24 m/s^2 on a mass m_2m2. What acceleration would the same force provide if both the masses are tied together?
Answer

From Force formula
$F=ma$F=ma
$5=8m_1$5=8m1 or $m_1=\frac{5}{8}$m1=58
and $5=24m_2$5=24m2 or $m_2=\frac{5}{24}$m2=524
Now when the two masses are tied and same force is applied, acceleration will be
$a=\frac{F}{m_1+m_2}=\frac{5}{\frac{5}{8}+\frac{5}{24}}=6m/s^2$a=Fm1+m2=558+524=6m/s2

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