

TEST NO. 3**CH – 3****PHYSICS****CLASS 9TH – 019****Paper: (Objective Type)****Time Allowed: 15 Minutes****Maximum Marks: 12**

Note : You have four choices for each objective type question as A , B, C and D. The choice which you think is Correct, fill that circles in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

Q. 1	QUESTIONS	(A)	(B)	(C)	(D)
1.	Rate of change of momentum according to time is equal to.	Inertia	Force	Velocity	Mass
2.	Formula of centripetal force is	$t \frac{v^2}{r}$	$\frac{mv^2}{r}$	st	v^2
3.	Unit of momentum?	Nm	Kgms ⁻²	Ns	Ns ⁻¹
4.	Which law of motion is called law of inertia.	First law of motion	Second law of motion	Third law of motion	Law of conservation of momentum
5.	The unit of coefficient of friction.	Newton	ms ⁻¹	ms ⁻²	No unit
6.	If the velocity of a moving body in a circle is doubled, then its centripetal force is.	Double	Half	Four times	None
7.	Inertia depends upon	Force	Net force	Mass	Velocity
8.	The direction of momentum is	Opposite to motion	Along the velocity	Perpendicular to motion	None
9.	A string is stretched by two equal and opposite forces 10 N each. The tension in the string is.	10 N	5 N	Zero	20 N
10.	The study of motion without reference to mass and force.	Mechanics	Dynamics	Kinematics	None
11.	The mass of a body.	Decreases when accelerated	Increases when accelerated	Decrease when moving with high velocity	None of the above.
12.	When a horse pulls a cart, the action is on the.	Cart	horse	Earth	Earth and cart

A B C D**A B C D****A B C D****A B C D****A B C D**

1	(A) (B) (C) (D)	4	(A) (B) (C) (D)	7	(A) (B) (C) (D)	10	(A) (B) (C) (D)	13	(A) (B) (C) (D)
2	(A) (B) (C) (D)	5	(A) (B) (C) (D)	8	(A) (B) (C) (D)	11	(A) (B) (C) (D)	14	(A) (B) (C) (D)
3	(A) (B) (C) (D)	6	(A) (B) (C) (D)	9	(A) (B) (C) (D)	12	(A) (B) (C) (D)	15	(A) (B) (C) (D)

نوٹ: معروضی سوال نامے کو توجہ سے پڑھیں اور ہر MCQ کی درست آپشن A, B, C, D کو پین کی سیاہی یا مارکر سے اس طرح پُر کریں کہ سیاہی دائرے سے باہر نہ نکلے۔ ایک سے زیادہ دائروں کو پُر کرنے یا کاٹ کر پُر کرنے کی صورت میں مذکورہ جواب غلط تصور ہوگا۔

TEST NO. 3**CH - 3****PHYSICS****Time Allowed: 1:45 hours****CLASS 9TH – 019****Paper : (Essay Type)****Maximum Marks: 48****(PART – I)****2. Write short answers to any Five (5) questions:****10**

- (i) Define inertia. Describe two examples of inertia.
- (ii) Why is it dangerous to travel on the roof of a bus?
- (iii) When a gun is fired, it recoils, why?
- (iv) What is the law of conservation of momentum?
- (v) A force of 20 N moves a body with an acceleration of 2 ms^{-2} . What is its mass?
- (vi) Define Sliding friction and rolling friction.
- (vii) How does oiling the moving parts of a machine lower friction?
- (viii) A horse pushes the cart. If the action and reaction are equal and opposite then how does the cart moves?

3. Write short answers to any Five (5) questions:**10**

- (i) Describe two situations in which force of friction is needed.
- (ii) Why rolling friction is less than sliding friction?
- (iii) Define Tension in a string, Braking force. Momentum.
- (iv) What would happen if all friction suddenly disappears?
- (v) In which case it is easy for the tyre to roll over? (i) Rough ground (ii) Smooth ground
- (vi) Why the spinner of a washing machine is made to spin at a very high speed?
- (vii) What will be the tension in a rope that is pulled from its ends by two opposite forces 100 N each?
- (viii) Action and reaction are always equal and opposite. Then how does a body move?

4. Write short answers to any Five (5) questions:**10**

- (i) Define Newton, Circular motion,
- (ii) Difference between Kinematics and Dynamics?
- (iii) Difference between Mass and Weight?
- (iv) State Newton Third law of motion.
- (v) Difference between Centripetal and Centrifugal force.
- (vi) Define Co-efficient of friction, Cream separator, banking of road.
- (vii) What is the advantage of banking of the road.
- (viii) State Newton Second Law of motion.

(PART – II)**Note:- Attempt any TWO questions.**

- 5. (a) Explain law of conservation of momentum? Also drive its formula? **4**
- (b) Two masses 26 Kg and 24 kg are attached to the ends of string which passes over a frictionless pulley. 26 kg is laying over a smooth horizontal table. 24 N mass is moving vertically downward. Find the tension in the string and the acceleration in the bodies. **5**
- 6. (a) State the Newton's first law of motion & Second law of motion. **4**
- (b) A force of 20 N moves a body with an acceleration of 2ms^{-2} . What is the mass. **5**
- 7. (a) Explain Centripetal force and Drive $F_c = mv^2/r$. **4**
- (b) How much centripetal force is needed to make a body of mass 0.5 kg to move to a circle of radius 50 cm with a speed 3 ms^{-1} . **5**

Physics

Test no:- 3

(Part - I)

Question no: 2

Write short answers to any five questions:

- (ii) Define inertia. Describe two example of inertia.

Ans Inertia of a body is its property due to which it resists any change in its state of rest or motion.

Example 1:

Take a glass cover it with a piece of cardboard. Place a coin on the cardboard. Now kick the card horizontally with a jerk of your finger.

The coin does not move with the cardboard with the inertia and falls in to the glass.

Example 2:

Cut a strip of paper. Place it on the table. Stack a few coins at its one end. Pull out the paper strip under the coins with a jerk. We will succeed in pulling out the paper strip under the stacked coin without letting them to fall.

ii) Why is it dangerous to travel at the roof of a bus?

Ans Because the friction force due to air acting on the upper part of body of the person who is travelling on the roof of the bus tends to turn over which is dangerous for passengers while the lower portion remains at rest w.r.t the roof of the bus.

iii) When a gun is fixed, it recoils, why?

Ans Because of Newton third law of motion. When a bullet is fired from a gun the force sending the bullet is equal to the force sending the gun backward.

iv) What is law of Conservation of momentum?

Ans The momentum of an isolated system of two or more than two interacting bodies remains constant.

v) A force of 20 N moves a body with an acceleration of 2 ms^{-2} . What is its mass?

Ans

$$F = 20\text{ N}$$

$$a = 2\text{ ms}^{-2}$$

$$m = ?$$

$$F = ma \quad \text{or} \quad m = F/a$$

$$m = \frac{20}{2} = 10\text{ kg}$$

Mass is 10 kg .

vi) Define Sliding friction and rolling friction?

Ans Sliding friction:

Sliding friction is also known as kinetic friction or moving friction and is defined as the force that is required to keep a surface sliding along another surface.

Rolling friction:

Resistance to motion by bodies that are in rolling contact.

vii) How does oiling the moving parts of a machine lower friction?

Ans The oil helps to slick the 2 surfaces so the molecules surface easily slide.

viii) A horse pushes the cart. If the action and reaction are equal and opposite then how does the cart move?

Ans When a horse pushes the ground the ground reacts and exerts a force on the horse in the forward direction. The force is able to overcome friction force of the cart and it moves.

Question no: 3

Write short answers to any five questions:

i) Describe two situations in which force of friction is needed?

Answer We cannot write if there would be no friction between pen and paper.

ii) Friction enables us to walk on the ground. We cannot run on a slippery ground. A slippery ground offers very less friction.

ii) Why rolling friction is less than sliding friction?

Ans we know that greater the points of contact between two surfaces, greater will be the friction and vice versa. Since the point of contact between surfaces in case of rolling are less than points of contact in case of sliding therefore rolling friction is less than sliding friction.

iii) Define Tension in a string, Braking force. Momentum?

Ans The tension force is the force that is transmitted through a string, rope, cable or wire when it is pulled tight by the force acting from opposite ends.

iv) What would happen if all friction suddenly disappears?

Ans If all friction suddenly disappears everyone dies because you can't walk or do anything.

v) In which case it is easy for the tyre to roll over? (i) Rough ground (ii) Smooth ground?

Ans Rough ground:

In case of rough ground it is difficult for the tyre to roll over because rough surface offers more friction.

Smooth ground:

In case of smooth ground it is easier for the tyre to roll over because smooth surface offers less friction.

vii) Why the spinner of a washing machine is made to spin at a very high speed?

Ans As the spin of water, water is pulled from the wet clothes through the small holes in the inner-tub into the outer-tub due to

centrifugal force. This helps to reduce dry time by leaving your clothes only slightly damp, rather than sopping wet after washing.

vii) What will be the tension in a rope that is pulled from its ends by two opposite forces 100 N ?

Ans The tension in a rope that is pulled from its ends by two opposite forces 100 N each will be 100 N .

viii) Action and reaction are always equal and opposite. Then how does a body move?

Ans Action and reaction are equal in magnitude but opposite in direction. Action and reaction do not act on the same body. Action is applied on the body due to which an equal and opposite reaction is acting on another body. Both of these do not neutralize each other due to which the body will move.

Question no: 4

Write short answers to any five question:

i) Define Newton, Circular motion?

Ans Remembers that Newton's Second law of Motion states that force is equal to mass times acceleration, and Uniform circular motion refers to perfectly circular motion around a center point.

ii) Difference between Kinematics and Dynamic?

Ans Kinematics is the study of motion and position, or the geometry of an event.

Dynamic is the study of forces and resulting motion on a body.

iii) Difference between Mass and weight?

Ans

Mass

Weight

1) Mass of a body is the quantity of matter possessed by the body

The weight of the body is equal to the force with which earth attracts it.

2) It is a scalar quantity

It is a vector quantity.

iv) State Newton third law of Motion?

Ans

To every action there is always an equal but opposite reaction.

v) Difference between Centripetal and Centrifugal force?

Ans

Centripetal force:

A force that keeps a body to move in a circle is known as centripetal force.

Centrifugal force:

The force which compels a body to move away from circular path.

vi) Define Co-efficient of friction, Cream separator, banking of road?

Ans. A coefficient of friction is a value that shows the relationship between the force of friction between two objects and the normal reaction between the objects are involved.

vii) What is the advantage of banking of road?

Ans. When a road is banked in a tight turn a lot of the normal reaction balances the centrifugal force so that we are not entirely dependent on friction which also force torque and can overturn the vehicle in tight turns.

viii) State Newton Second Law of motion?

Ans When a net force ' F ' acts on a body, it produces an acceleration in the body direction of force and the magnitude of acceleration is directly proportional to the force and is inversely proportional to the mass of the body.

(Part-II)

Question no:- 5(a)

The momentum of an isolated system of two or more than two or more than two interacting bodies remain constant.

An isolated system is a group of interacting bodies on which no external force is acting. If no unbalanced or net force acts on a system then its momentum remains constant.

Consider a system of gun and a bullet. Before firing, the velocity of the bullets as well as that of gun was zero. Therefore the total momentum of both the objects was also zero.

We can write it as,

Total momentum of gun and bullet before firing = 0

When the gun is fired bullet shoots out of gun and acquires momentum. To conserve momentum the

gun recoils backward. Now according to the law of conservation of momentum, the total momentum of the gun and bullet will also be zero after the gun is fired.

Let m be the mass of the bullet and v be its velocity on firing the gun; M be the mass of the gun and V is the velocity with which it recoils. Thus the total momentum of the gun is fired will be:

The momentum of the gun and the bullet after the gun is fixed
 $= MV + mv$

According to the law of conservation of momentum.

Total momentum before fixing = Total momentum after fixing

$$MV + mv = 0$$

$$MV = -mv$$

OR $V = -\frac{m}{M} v$

Question no.: 5(b)

Ans

$$m_1 = 24 \text{ kg}$$

$$m_2 = 26 \text{ kg}$$

$$g = 10 \text{ ms}^{-2}$$

$$a = ?$$

$$T = ?$$

Sol

$$a = \frac{m_1 g}{m_1 + m_2}$$

$$a = \frac{24 \times 10}{24 + 26}$$

$$a = \frac{240}{50}$$

$$a = 4.8 \text{ ms}^{-2}$$

$$T = \frac{m_1 m_2 g}{m_1 + m_2}$$

$$T = \frac{24 \times 26 \times 10}{24 + 26}$$

$$T = \frac{6240}{50}$$

$$T = 124.8 \text{ N}$$

$$T = 125 \text{ N}$$

Result:

$$a = 4.8 \text{ ms}^{-2}$$

$$T = 125 \text{ N}$$

Question no- 6(a)

Ans Newton first law:

A body continues in its state of rest or of uniform motion in a straight line provided no net force acts on it.

Explanation for rest:

Similarly Newton's first law of motion deals with bodies which are either at rest or moving with uniform speed in straight line

According to first law of motion, a body at rest remains at rest provided no net force on it.

This part of the law is true as we observe that objects do not move by themselves unless someone moves it.

Explanation for motion:

Similarly a moving object does not stop moving by itself. A ball rolled on a rough ground stops earlier than that rolled on smooth ground. It is because rough surface offers greater friction. If there would be no force to oppose the motion of the body, it would never stop.

Newton's Second law of motion:

When a net force acts upon a body, it produces an acceleration in the body in the direction of force and the magnitude of acceleration is directly proportional to the net force and is inversely proportional to

the mass of the body.

Mathematical form:

If the force F is acting on the body of mass m then we can write this in the mathematical form is as

$$a \propto F \longrightarrow \textcircled{1}$$

$$a \propto \frac{1}{m} \longrightarrow \textcircled{2}$$

From $\textcircled{1}$ and $\textcircled{2}$ we have

$$a \propto \frac{F}{m}$$

$$a = \text{constant} \times \frac{F}{m}$$

$$a = K \times \frac{F}{m}$$

In above equation according to the international system units if $m=1\text{kg}$, $a = 1\text{ms}^{-2}$, $F = 1\text{N}$ then the value of K will be 1. So the equation can be written as

$$a = 1 \times \frac{F}{m}$$

$$F = ma$$

Question no:- 6(b)

Ans

$$F = 20 \text{ N}$$

$$a = 2 \text{ ms}^{-2}$$

$$m = ?$$

Solution:-

$$F = ma$$

$$\text{So } m = \frac{F}{a}$$

$$m = \frac{20}{2}$$

$$m = 10 \text{ kg}$$

Question no:- 7(a)

Ans

A force that keeps a body to move in a circle is known as centripetal force.

Explanation:

Consider a body tied at the end of a string moving with uniform speed in a circular path.

A body has the tendency to move in a straight line due to inertia. The string to which body

is tied keeps it to move in a circle by pulling the body towards the center of the circle. The string pulls the center of the circle. The string pulls the body perpendicular to its motion. The pulling force continuously changes the direction of motion. The pulling force continuously changes the direction of motion and remains towards the center of the circle. This center seeking force is called the centripetal force

Equation:

$$F_c = ma_c$$

$$\text{So } ma_c = \frac{mv^2}{r}$$

$$a_c = \frac{v^2}{r}$$

Question no: 7(b)

Ans

$$m = 0.5 \text{ Kg}$$

$$r = 50 \text{ cm} = 0.5 \text{ m}$$

$$v = 3 \text{ ms}^{-1}$$

$$F_c = ?$$

As we know that

$$F_c = \frac{mv^2}{r}$$

$$F_c = \frac{0.5 \times (3)^2}{0.5}$$

$$F_c = 9 \text{ N}$$