

QB365 Question Bank Software Study Materials

Laws of Motion Important 2 Marks Questions With Answers (Book Back and Creative)

10th Standard

Science

Total Marks : 60

2 Marks

30 x 2 = 60

- 1) Define inertia. Give its classification.

Answer : The inherent property of a body to resist any change in its state of rest or the state of uniform motion, unless it is influenced upon by an external unbalanced force is known as 'inertia'.

Types:

- (i) Inertia of rest
 - (ii) Inertia of motion
 - (iii) Inertia of direction
- 2) Classify the types of force based on their application.

Answer : Based on the direction in which the force acts, they can be classified into two types as:

- (i) Like Parallel forces
 - (ii) Unlike Parallel forces.
- 3) If a 5 N and a 15 N forces are acting opposite to one another. Find the resultant force and the direction of action of the resultant force.

Answer : Let, $F_1 = 5 \text{ N}$

$F_2 = 15 \text{ N}$

$F_{\text{net}} = F_2 - F_1 \quad [\because F_2 > F_1]$

$= 15 - 5 = 10 \text{ N}$

F_{net} i.e, the resultant force acts along the direction of the greater force 15 N.

- 4) Differentiate mass and weight.

Answer :

| | S.NO | MASS | WEIGHT |
|-------|-------------|--|--|
| (i) | | Fundamental quantity. | Derived quantity. |
| (ii) | | It is the amount of matter containing in a body. | It is the gravitational pull acting on the body. |
| (iii) | | Its unit is kilogram (kg). | Its unit is newton (N). |
| (iv) | | Remains the same. | Varies from one place to another place. |
| (v) | | It is a scalar quantity. | It is a vector quantity. |

- 5) Define moment of a couple.

Answer : (i) The rotating effect of a couple is known as moment of a couple.

(ii) Eg: Turning a tap, winding or unwinding a screw, spinning of a top, etc...

(iii) Moment of a couple = Force x perpendicular distance between the line of action of force.

(iv) $M = F \times S$

- 6) State the principle of moments.

Answer : (i) When a number of like or unlike parallel forces act on a rigid body and the body is in equilibrium, then the algebraic sum of the moments in the clockwise direction is equal to the algebraic sum of the moments in the anti-clockwise direction.

(ii) Moment in clockwise direction = Moment in anticlockwise direction.

(iii) $\mathbf{F}_1 \times \mathbf{d}_1 = \mathbf{F}_2 \times \mathbf{d}_2$.

7) State Newton's second law.

Answer : (i) "According to Newton's second law, the force acting on a body is directly proportional to the rate of change of linear momentum of the body and the change in momentum takes place in the direction of the force".

(ii) Force = mass \times acceleration

(iii) $\mathbf{F} = \mathbf{m} \times \mathbf{a}$

8) Why a spanner with a long handle is preferred to tighten screws in heavy vehicles?

Answer : (i) A spanner has a long handle to produce a larger moment of force by a small force applied normally at the end of its handle.

(ii) **Moment of force** = $\vec{\mathbf{F}} \times \vec{\mathbf{d}}$

9) While catching a cricket ball the fielder lowers his hands backwards. Why?

Answer : (i) Catching a cricket ball the fielder lowers his hands backwards. Because, he stops his hands soon after catching the ball, the ball comes to rest very quickly.

(ii) It means that the momentum of the ball is brought to rest very quickly.

(iii) So the average force acting on the body will be large.

(iv) Due to this large average force, the hands will get hurt.

(v) To avoid getting hurt, the player brings the ball to rest slowly.

10) How does an astronaut float in a space shuttle?

Answer : (i) Since, space station and astronauts have equal acceleration, they are under free fall condition.

(ii) Both the astronauts and the space station are in the state of weightlessness.

(iii) They are not actually floating but falling freely around the earth due to the huge orbital velocity.

11) When is a body said to be in rest and motion?

Answer : (i) When an object does not change its state during period of time, then it is said to be in the state of "rest".

(ii) When an object changes its state during a period of time, then it is said to be in the state of "motion".

12) Handle in a door is always placed at the edge of door. Why?

Answer : The door can be easily opened or closed if we apply the force at a point far away from the fixed edge.

(i) In this case, the effect of the force we apply is to rotate the door about the fixed edge.

(ii) This rotational effect of the applied force is more about the 'axis of rotation' when the distance between the fixed edge and the point of application of force is more.

13) Give more examples for the cases in which the time of action of force is made large to have less force?

Answer : (i) Fragile items like glass crockery etc., are wrapped in straw or paper strips in boxes for shipment to avoid breakage.

(ii) Chalks are packed with husks in between to reduce impact forces while transportation.

(iii) Automobiles are fitted with springs and shock absorbers to reduce jerk while moving in uneven roads

14) What is Dynamics? Write its branches based on the study of moving objects under the action of forces?

Answer : Dynamics: It is the study of moving bodies under the action of forces. Dynamics is further divided as follows.

(i) Kinematics deals with the motion of bodies without considering the cause of motion.

(ii) Kinetics deals with the motion of bodies considering the cause of motion.

15) If 25 N of force is used to compress a spring, then how much reactive force exerted by spring?

Answer : Reactive force by spring = -25 N.

When a 25 N of forces is used to compress a spring, then same amount of force will be exerted by the spring in the opposite direction. This is according to Newton's III law of motion. i.e., To every action there is an equal and opposite reaction.

16) Write the different types of motion.

Answer : The different types of motion are:

- i) Linear motion.
- ii) Circular motion.
- iii) Oscillatory motion.

17) Write the types of Dynamics.

Answer : Dynamics have 2 types. They are;

- i) Kinematics.
- ii) Kinetics.

18) Define Kinetics.

Answer : It deals with the motion of bodies considering the cause of motion.

19) Define natural motion.

Answer : Moving body naturally comes to rest without any external influence of the force. Such motions are formed as natural motion.

20) Describe the activity about inertia of rest.

Answer : Take a glass tumbler and place a small card board on it. Now keep a coin at the centre of the card board. Then flick the card board quickly. The inertia of the coin keeps it in the state of the rest when the card board moves, and so the coin falls into the tumbler due to gravity. This happens due to inertia of rest.

21) Define Resultant Force.

Answer : When several forces act simultaneously on the same body, then the combined effect of the multiple forces can be represented by a single force which is termed as Resultant Force.

22) How could you calculate the mass of the earth (M)?

Answer : Mass of the Earth (M) = gR^2/G . Substituting the known value of g, R and G. We calculate the mass of the earth as M = 5.972×10^{24} kg.

23) Define Mass.

Answer : Mass is the basic property of a body. Mass of a body is defined as the quantity of matter contained in the body. SI unit is Kilogram (kg).

24) Define Weight.

Answer : Weight of a body is defined as the gravitational force exerted on it due to the Earth's gravity alone.

Weight = Gravitational Force.

= mass (m) x acceleration due to gravity (g).

= m x g.

25) What is inertia of motion? Give example.

Answer : (i) The resistance of a body to change its state of motion is called inertia of motion.

(ii) An athlete runs some distance before jumping, because this will help him jump longer and higher.

26) What are like parallel forces?

Answer : Two or more forces of equal or unequal magnitude acting along the same direction, parallel to each other are called like parallel forces.

27) What are unlike parallel forces?

Answer : If two or more equal forces or unequal forces act along opposite directions parallel to each other, then they are called unlike parallel forces.

28) Define weight. Give its unit

Answer : Weight of a body is defined as the gravitational force exerted on it due to the Earth's gravity. Unit of weight is Newton (N).

29) How can change in momentum be achieved?

Answer : Change in momentum can be achieved in two ways. They are

- (i) A large force acting for a short period of time.
- (ii) A smaller force acting for a longer period of time .

30) What do you mean by inertia of direction? Give example.

- Answer :** (i) The resistance of a body to change its direction of motion is called inertia of direction.
(ii) When we make a sharp turn while driving a car we tend to lean sideways due to inertia of direction.