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Including AL-RAZI Assessment Test Book

Written & Composed by AL-RAZI Academic Development Unit (ADU)

Chapter 3: Dynamics

Boards' Topic Wise Multiple Choice AND SHORT Questions Classified Precisely According to the New Examination Techniques of Education Department
(Knowledge, Understanding, Application, Analytical & Conceptual)

3.1 Concept of Force

Multiple Choice Questions (MCQs)

1. Friction is a:
A Contact force B Non-contact force C Nuclear force D Magnetic force

2. The value of 'G' is:
A $6.67 \times 10^{-11}\,Nm^2Kg^{-2}$ B $6.67 \times 10^{-9}\,Nm^2Kg^2$
C $6 \times 10^{-11}\,Nm^2Kg^{-2}$ D $6.67 \times 10^{24}\,Nm^2Kg^{-2}$

3. Non-contact force is also called:
A Friction B Thrust C Field force D Drag

Short Questions

1. Define contact force and . Give some examples.

Ans. **Contact Forces:** A contact force is a force that is exerted by one object on the other at the point of contact.

Examples: (i) Friction **(ii)** Drag **(iii)** Thrust

Non-contact Force: A non-contact force is defined as the force between two objects which are not in physical contact. The non-contact forces can work from a distance.

Examples: (i) Gravitational Force **(ii)** Electrostatic Force **(iii)** Magnetic Force

2. Define air resistance, tension force and elastic force.

Ans. **(i) Air Resistance:** It is the resistance (opposition) offered by air when an object falls through it.

(ii) **Tension Force:** It is the force experienced by a rope when a person or load pulls it.

(iii) **Elastic Force:** It is a force that brings certain materials back to their original shape after being deformed.

Examples: Rubber bands, springs, trampoline, etc.

3. What do you mean by electrostatic force and strong and weak nuclear force.

Ans. **Electrostatic Force:** An electrostatic force is a force that acts between two charged objects. The opposite charges attract each other and similar charges repel each other.

Strong and Weak Nuclear Forces: These are non-contact forces acting between the subatomic particles.

3.2 Fundamental Forces

Multiple Choice Questions (MCQs)

4. The number of fundamental forces in nature:
A 2 B 3 C 4 D 5

5. The range of strong nuclear force is:
A $10^{-14}\,m$ B $10^{-16}\,m$ C $10^{-6}\,m$ D $10^{-7}\,m$

6. Unchange particle in β-decay is:
A Electron B Proton C Neutron D Antineutrino

Short Questions

1. What do you mean by gravitational force?

Ans. Gravitational force is an attractive force that exists among all bodies which have mass.

2. What are strong nuclear forces? Explain.

Ans. Strong nuclear force holds the atomic nuclei together by binding the protons and neutrons in the nucleus over-coming repulsive electromagnetic force between positively charged protons. It is also a short-range force with the order of 10^{-14}m. If the distance between nucleons increases beyond this range, this force ceases to act.

3. Explain the unification of weak nuclear and electromagnetic forces?

Ans. A Pakistani scientist Dr. Abdus Salam, Sheldon Glashow and Steven Weinberg were awarded in 1979 Nobel Prize in Physics for their contributions to unification theory.

They explain the behaviour of weak nuclear force and electromagnetic force is different for everyday phenomena but at very high energy the theory models these forces as a single force called electroweak force. This is called unification of nuclear force and electromagnetic force.

4. What do you mean by Electromagnetic Force?

Ans. It is the force that causes the interaction between electrically charged particles. Electrostatic and magnetic forces come under this category. These are long-range forces.

3.3 Forces in a Free- Body Diagram

Multiple Choice Questions (MCQs)

7. External force acts on body:

A Friction B Gravity C Drag D All

8. Free body diagram is example of:

A Simple diagram B Vector diagram C Scalar diagram D Complex diagram

Short Questions

1. How many external forces act on body? Give examples.

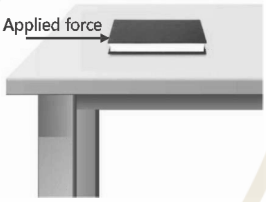
Ans. External forces acting on an object may include:

(i) friction **(ii)** gravity

(iii) normal force **(iv)** drag

(v) tension in a string

(vi) a human force due to pushing or pulling



3.4 Newton's Laws of Motion

Multiple Choice Questions (MCQs)

9. Sir Isac Newton was born in:

A Lincolnshire B Africa C America D Ireland

10. Inertia depends on:

A Force B Weight C Mass D Speed

11. One newton is equal to:

A 10 $kgms^{-2}$ B 1 $kgms^{-2}$ C 5 $kgms^{-2}$ D 100 $kgms^{-2}$

Short Questions

1. State Newton's first law of motion. Why it is called law of inertia?

Ans. **Statement:** "A body continues its state of rest or of uniform motion in a straight line unless acted upon by some external force."

Law of inertia: As Newton's first law of motion deals with the inertial properties of matter so it is called law of inertia.

2. When the table cloth is pulled abruptly, the objects remain in their original position on the table. Why?

Ans. When the table cloth is pulled abruptly, the objects remain in their original position on the table due to inertia which maintains its state of rest.

3. Define 1 Newton force.

Ans. **Newton:** One newton is the force which produces an acceleration of 1 ms^{-2} in a body of mass 1 kg.

$$1\ N = 1\ kg\ ms^{-2}$$

3.5 Limitations of Newton's Laws of Motion

Multiple Choice Questions (MCQs)

12. Newton's laws of motion are not applicable for:

A Large object B Medium size objects C Small objects D Elementary particles

13. Relativistic mechanics was developed by:

A Newton B Fleming C Einstein D Henry

Short Questions

1. What are the limitations of Newton's laws of motion?

Ans. Newton's laws of motion are not exact for all types of motion, but provide a good approximation, unless an object is small enough or moving close to the speed of light. There are limitations of Newton's laws of motion when we deal with the motion of elementary particles having velocities close to that of light. For that purpose, relativistic mechanics developed by Albert Einstein is applicable.

3.6 Mass and Weight

Multiple Choice Questions (MCQs)

14. The force with which earth attracts the body is called:

A Contact force B Drag force C Resistance D Weight

15. Weight is measured by:

A Ordinary balance B Physical balance C Lever balance D Spring balance

16. SI unit of weight is:

A Kg B N C KN D g

Short Questions

1. Define gravitational field.

Ans. The gravitational field is a space around a mass in which another mass experiences a force due to gravitational attraction.

2. What is gravitational field strength? Write its value?

Ans. **Gravitational field strength:** The gravitational field strength is defined as the gravitational force acting on unit mass.

Value: Its value is 10 $N\ kg^{-1}$.

3. Why does weight of a body varies from place to place?

Ans. The weight of a body depends upon the value of g (W=mg). As the value of g varies from place to place, therefore, the value of weight does not remain the same everywhere.

4. Differentiate between mass and weight.

Ans. **Mass:** The characteristic of a body which determines the magnitude of acceleration produced when a certain force acts upon it is known as mass of the body. Mass is a scalar quantity. It

remains the same everywhere. Practically, mass is measured by an ordinary balance. The SI unit of mass is kilogram (kg).

Weight: The weight of an object is equal to the force with which the Earth attracts the body towards its centre. Weight is a gravitational force acting on the object. It is a vector quantity directed downward, towards the centre of the Earth. The value of weight does not remain the same everywhere. The weight cannot be measured by an ordinary balance. A spring balance can be used to measure the weight. The SI unit of weight is newton (N).

3.7 Mechanical and Electronic Balances

Multiple Choice Questions (MCQs)

17. Which instrument is called Newton meter:
A Force meter B Lactometer C Ammeter D Manometer

18. Standard weights are not required for:
A Beam balance B Lever balance C Electronic balance D Physical balance

19. The weight of 100 g is equal to:
A 1N B 3N C 2N D 4N

Short Questions

1. What are balance scales?

Ans. The scales which are used to measure mass or weight of an object by comparing it with standard weights is called balance scale.

Examples: (i) Mechanical Balances (ii) Electronic Balances (iii) Force Meter

2. Define electronic balance. Write its working.

Ans. Electronic balance: Electronic balance is used to measure the mass of different objects.

Working: No standard weights are required to use in an electronic balance. Only it has to be connected to a power supply. When an object is placed on it, its mass is displayed on its screen. Electronic balances also display the total price of the material if the rate per kg is fed to the balance.

3. How weight of an object is measured with the help of force meter?

Ans. The object to be weighed is hung with the hook. The mass of the object causes the spring to compress. The pointer indicates the weight of the object.

3.8 Friction

Multiple Choice Questions (MCQs)

20. The force which opposes the motion is called:
A Nuclear force B Non-contact force C Restoring force D Friction

21. Which friction is the smallest:
A Sliding friction B Static friction C Kinetic friction D Rolling friction

Short Questions

1. How energy is dissipated during friction?

Ans. Dissipation of energy: Friction is a dissipative force due to which the energy is wasted in doing work to overcome against friction. The lost energy appears in the form of heat.

Example: When we rub our hands, heat is produced due to friction and our hands become warm.

2. Define terminal velocity. Give example?

Ans. Terminal Velocity: When upward air resistance balances the downward force of gravity on a falling object, it falls down with constant (safe) velocity, it is called terminal velocity.

Example: A paratrooper coming down with terminal velocity.

3. What is hovercraft? How does it move?

Ans. **Hovercraft:** A hovercraft is a kind of ship that can move over the surface of water and ground both.

Working: Air is ejected underneath the hovercraft by powerful fans forming a cushion of air. The hovercraft moves over the cushion of air which offers very small resistance.

4. Write four methods to reduce friction.

Ans. **(i)** The parts which slide against each other are highly polished.

(ii) Oil or grease should be apply between the moving parts of the machinery.

(iii) Sliding friction is converted into rolling friction by the use of ball bearings in the machines and wheels under the heavy objects.

(iv) the bodies moving through air or water are streamlined to minimize air or water friction. In this case, the air passes smoothly over the slanting surface of vehicle.

3.9 Momentum and Impulse

Multiple Choice Questions (MCQs)

22. The product F.Δt is called:

A Momentum B Impulse C Inertia D Elasticity

23. Rate of change of momentum is equal to:

A Inertia B Acceleration C Pressure D Force

Short Questions

1. Why fragile objects are packed in soft materials like styrofoam boxes?

Ans. Fragile objects such as glassware may break easily due to jerks or by the direct impact with hard objects during their transportation.

To protect them soft, packing materials are used for these objects. These materials reduce the effect of quick change in momentum. Consequently, the force acting on the fragile objects is greatly reduced.

2. What is a crumple zone?

Ans. A crumple zone of an automobile is a structural feature designed to compress during an accident to absorb deformation energy from the impact.

3. Why crumple zones are made in front and behind the main body of the vehicles?

Ans. Typically, crumple zones are located in front and behind the main body of the vehicle because they are designed to compress during an accident to absorb deformation energy from the impact.

Crumple zones work by managing crash energy absorbing within the outer parts of the vehicle, rather than being directly transmitted to the occupants.

3.10 Principle of Conservation of Momentum

Multiple Choice Questions (MCQs)

24. Collection of objects is called:

A Molecule B System C Ideas system D Compound

25. Principle of conservation of momentum is applicable for:

A Macro objects B Atom C Molecules D All of these

Short Questions

1. State principle of conservation of momentum.

Ans. **Statement:** If no external force acts on an isolated system, the final total momentum of the system is equal to the initial total momentum of the system.

Equation:

Total momentum of the system before collision = Total momentum of the system after collision

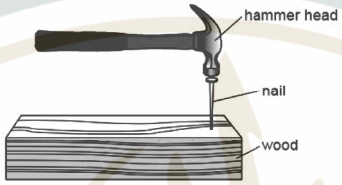
or $m_1v_1 + m_2v_2 = m_1v_1' + m_2v_2'$

2. What is purpose of seatbelt in vehicles?

Ans. When a moving car stops suddenly, the passengers move forward toward the windshield. Seatbelts prevent the passengers from moving. Thus, chances of hitting the passengers against the windshield or steering wheel are reduced.

Analytical/Conceptual MCQs

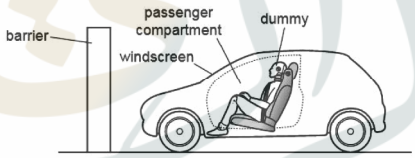
26. Fig. shows a hammer being used to drive a nail into a place of wood:



The mass of the hammer head is 0.15 kg.
The speed of the hammer head when it hits the nail is 8.0 m/s.
The time for which the hammer head is in contact with the nail is 0.0015 s.
The hammer head stops after hitting the nail.
What is the magnitude of the force exerted by the nail on the hammer head?

A 800 N B 1,200 N C 1,600 N D 8,000 N

27. Fig. shows a dummy of mass 70 kg used in a crash test to investigate the safety of a new car:



The car approaches a solid barrier at 20 m/s. It crashes into the barrier and stops suddenly.
What happens to the momentum of the dummy when the car stops suddenly?

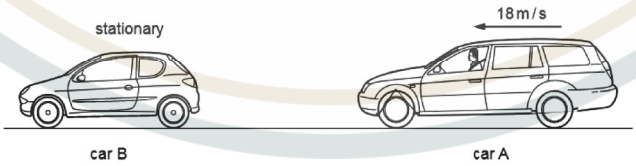
A It becomes zero. B It doubles. C It remains the same. D It reverses direction.

28. Fig. shows two railway trucks on a track:

Truck a of mass 6000 kg is moving at 5.0 m/s. It is approaching truck B of mass 5000 kg, which is stationary.
What is the momentum of truck a before the collision?

A 5000 kg.m/s B 6000 kg.m/s C 30,000 kg.m/s D 25,000 kg.m/s

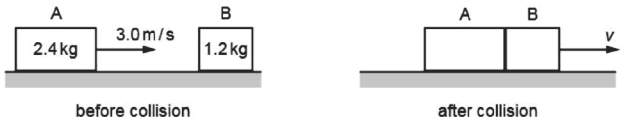
29. Fig. shows two cars, A and B, before they collide:



Car B, of mass 1200 kg, is stationary. Car A, of mass 2000 kg, is travelling towards car B at 18 m/s.
Which principle is used to determine the final velocity of the cars after the collision?

A Newton's first law B Newton's second law
C Conservation of momentum D Conservation of energy

30. Fig. shows a collision between two blocks A and B on a smooth, horizontal surface:



Before the collision, block A, of mass 2.4kg, is moving at 3.0 m/s. Block B, of mass 1.2 kg, is at rest.
After the collision, blocks A and B stick together and move with velocity v.
If the collision lasted 0.05 seconds, what was the average force exerted on block B?

A 24 N B 48 N C 72 N D 144 N

31. A book rests on a table. Which statement explains why it remains stationary?

A The table exerts a net upward force. B No forces act on the book.
C Inertia resists changes to its state of rest. D Gravity suddenly disappears.

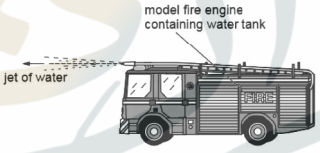
32. An object weight 98 N on earth. What will be its mass and weight on the moon (where = g_m = 1.6N/kg)?

A Mass = 10 kg, weight = 16 N B Mass = 9.8 kg, weight = 15.7 N
C Mass = 10 kg, weight = 98 N D Mass = 98 kg, weight = 1.6 N

33. A 5kg box accelerates at 2 m/s² on a frictionless surface. The applied force is:

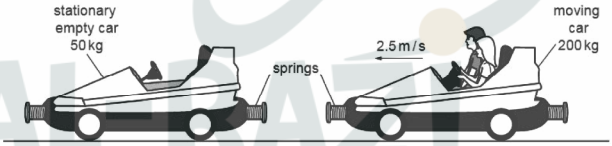
A 2.5 N B 5 N C 10 N D 20 N

34. A model fire engine with its brakes applied emits a jet of water at a raate of 0.80 kg every 6.0 s with a velocity of 0.72 m/s relative to the model (as shown in Fig.). Assuming no friction acts on the wheels, what is the magnitude of the force exerted on the fire engine due to the water jet?



A 0.096 N B 0.12 N C 0.58 N D 1.20 N

35. Fig. shows two fairground "bumper" cars:



The car with passengers, of total mass 200 kg, is moving in a straight line. It is travelling at 2.5 m/s when it hits a stationary empty car of mass 50 kg.
After the collision, the empty car moves forwards in the same direction at a speed of 4.0m/s.
What is the initial momentum of the moving car (200 kg) before the collision?

A 125 kg-m/s B 500 kg-m/s C 250 kg-m/s D 1000 kg-m/s

Analytical/Conceptual Short Questions

1. How does mass relate to inertia?

Ans. Mass is directly related to inertia, which is resistance of object to changes in its state of rest or motion. The greater the mass, the greater the inertia, meaning it requires more force to change the motion of object. This explains why a heavy truck is harder to accelerate than a small car.

2. What is the gravitational field strength, and how is it calculated?

Ans. Gravitational field strength (g) is the force per unit mass experienced by an object in a gravitational field. It can be calculated as: g = W / m
it gives the acceleration due to gravity, and on Earth, it is approximately 10 N/kg, meaning every kilogram experiences a force of 10 N due to gravity.

3. How does a spring balance work to measure weight?

Ans. A spring balance measures weight using Hooke's Law, which states that the force needed to extend or compress a spring is proportional to the distance the spring is stretched. The weight of an object stretches the spring, and the force (weight) is measured based on how much the spring stretches.

4. What are the four fundamental forces in nature?

Ans. The four fundamental forces are:

Gravitational force: Weakest but infinite range, responsible for attraction between masses.

Electromagnetic force: Acts between charged particles and is responsible for electricity and magnetism.

Strong nuclear force: Holds nuclei together, very strong but short-range.

Weak nuclear force: Responsible for radioactive decay, also short-range.

These forces have different strengths and effects on matter.

5. How does force affect the velocity of an object?

Ans. Force can change the velocity of an object in two ways:

By changing its speed: For example, accelerating a car.

By changing its direction: For example, steering a car around a corner.

In both cases, the force alters the state of object of motion.

6. What are the limitations of Newton's laws of motion?

Ans. Newton's laws of motion do not apply at very high speeds (close to the speed of light), in very strong gravitational fields (near black holes), or at atomic scales, where quantum mechanics becomes more applicable.

7. What happens when an object reaches terminal velocity?

Ans. Terminal velocity occurs when the force of gravity pulling an object downward is balanced by the air resistance (drag) acting upward. At this point, the object stops accelerating and continues falling at a constant speed.

8. What is impulse, and how is it related to momentum?

Ans. Impulse is the change in momentum of an object, calculated by:

Impulse = $F \times \Delta t = m \times \Delta v$

It is the product of the average force and the time interval during which the force acts. Impulse changes the momentum of an object.

9. Compare rolling and sliding friction.

Ans. Rolling friction (e.g., wheels) is weaker as it involves minimal surface contact. Sliding friction (e.g., dragging a box) is stronger due to continuous surface interaction.

10. What is the resultant force in terms of momentum?

Ans. The resultant force is the rate of change of momentum of an object. If the momentum of an object changes, there must be a resultant force acting on it:

$F = \Delta p / \Delta t$

This reflects how force influences the momentum of an object.

MCQ's Key

1.	A	**2.**	A	**3.**	C	**4.**	C	**5.**	A	**6.**	D	**7.**	D	**8.**	B	**9.**	A	**10.**	C
11.	B	**12.**	D	**13.**	C	**14.**	D	**15.**	D	**16.**	B	**17.**	A	**18.**	C	**19.**	A	**20.**	D
21.	D	**22.**	B	**23.**	D	**24.**	B	**25.**	D	**26.**	A	**27.**	A	**28.**	C	**29.**	C	**30.**	B
31.	C	**32.**	B	**33.**	C	**34.**	A	**35.**	B										

Exercise

A. Multiple Choice Questions

3.1. When we kick a stone, we get hurt. This is due to:

A inertia B velocity C momentum D reaction

3.2. An object will continue its motion with constant acceleration until:

A the resultant force on it begins to decrease. B the resultant force on it is zero.
C the resultant force on it begins to increase.
D the resultant force is at right angle to its tangential velocity.

3.3. Which of the following is a non-contact force?

A Friction B Air resistance C Electrostatic force D Tension in the string

3.4. A ball with initial momentum p hits a solid wall and bounces back with the same velocity. Its momentum p after collision will be:

A $p' = p$ B $p' = -p$ C $p' = 2p$ D $p' = -2p$

3.5. A particle of mass m moving with a velocity v collides with another particle of the same mass at rest. The velocity of the first particle after collision is:

A v B -v C 0 D –1/2

3.6. Conservation of linear momentum is equivalent to:

A Newton's first law of motion B Newton's second law of motion
C Newton's third law of motion D None of these

3.7. An object with a mass of 5 kg moves at constant velocity of 10 m s^{-1}. A constant force then acts for 5 seconds on the object and gives it a velocity of 2 ms^{-1} in the opposite direction. The force acting on the object is:

A 5 N B –10N C –12 N D –15 N

3.8. A large force acts on an object for a very short interval of time. In this case, it is easy to determine:

A magnitude of force B time interval
C product of force and time D none of these

3.9. A lubricant is usually introduced between two surfaces to decrease friction. The lubricant:

A decreases temperature B acts as ball bearings
C prevents direct contact of the surfaces
D provides rolling friction

MCQ's Key

3.1	D	**3.2**	C	**3.3**	C	**3.4**	B	**3.5**	C	**3.6**	C
3.7	C	**3.8**	C	**3.9**	C						

B. Short Answer Questions.

3.1. What kind of changes may be produced by a force?

Ans. The changes produced by a force are:

Rest or motion: Force can change the state of rest or motion of body.
Velocity: Force can change the velocity of body and can produce acceleration of body.
Shape or size: Force can change shape of size of body by applying force.
Direction: Force can also change the direction of a moving body.
Energy: We can transfer energy by applying force.

3.2. Give 5 examples of contact forces.

Ans. **(i)** Friction **(ii)** Drag **(iii)** Thrust
(iv) Normal Force **(v)** Air Resistance **(vi)** Tension Force
(vii) Elastic Force

3.3. An object moves with constant velocity in free space. How long will the object continue to move with this velocity?

Ans. An object continues its motion with constant velocity in free space unless acted upon by some external force according to Newton's first law of motion.

3.4. Define impulse of force.

Ans. **Impulse:** It is the product of force acting on a body for a very short interval of time t.

Formula: Impulse = $F \times \Delta t$

Unit: Its unit is Ns.

3.5. Why has not Newton's first law been proved on the Earth?

Ans. Newton's first law of motion has not been proved on earth because it is valid only in the absence of net force and there are many forces on earth like friction, air resistance and gravity.

3.6. When sitting in a car which suddenly accelerates from rest, you are pushed back into the seat, why?

Ans. When sitting in a car which suddenly accelerates from rest, we are pushed back into the seat due to inertia as according to law of inertia, a body at rest wants to continue its state of rest or resists the change in its state of rest.

3.7. The force expressed in Newton's second law is a net force. Why is it so?

Ans. As net force is the sum of all the forces acting on a body like air resistance, friction, gravitational force, applied force so it is important to consider net force as it determines the objects' overall motion.

3.8. How can you show that rolling friction is lesser than the sliding friction?

Ans. **Reason:** The reason for the rolling friction to be lesser than the sliding friction is that there is no relative motion between the wheel and the surface over which it rolls. Morover the wheel touches the surface only at one point which reduces the sliding friction but in case of sliding friction there is a relative motion between surface and sliding body. Moreover the contact area between sliding body and surface is more which increases the sliding friction.

3.9. Define terminal velocity of an object.

Ans. **Terminal Velocity:** When upward air resistance balances the downward force of gravity on a falling object, it falls down with constant (safe) velocity, it is called terminal velocity.

Example: A paratrooper coming down with terminal velocity.

3.10. An astronaut walking in space wants to return to his spaceship by firing a hand rocket. In what direction does he fire the rocket?

Ans. As according to Newton's third law of motion "Action and reaction are always equal but opposite in direction" so the astronaut will fire the rocket in opposite direction to the spaceship to return to his spaceship.

C. Constructed Response Questions.

3.1 Two ice skaters weighing 60kg and 80 kg push off against each other on a frictionless ice track. The 60 kg skater gains a velocity of 4 ms^{-1}. Considering all the relevant calculations involved, explain how Newton's third law applies to this situation.

Ans. As Newton's third law of motion states.

"Action and reaction are always equal but opposite in direction".

So, skater with mass 60kg will push the skater of mass 80kg with some force and as a reaction the skater with mass 80kg will also apply the same force on the skater with mass 60kg and both will move away from each other.

Calculation for velocity:

$m_1 = 60$ kg

$v_1 = 4ms^{-1}$

$m_2 = 80$ kg

$v_2 = ?$

Before collision both skaters are stationary. So, total momentum will be 'zero'.

Apply the law of conservation of momentum.

$$0 = m_1v_1 + m_2v_2$$

$$0 = 60 \times 4 + 80 \times v_2$$

$$0 = 240 + 80 \times v_2$$

$$-240 = 80 \times v_2$$

$$\frac{-240}{80} = v_2$$

$$v_2 = -3ms^{-1}$$

The velocity of the staker with mass 80kg is $3ms^{-1}$. Negative sign indicates, the both skaters will move opposite to each other.

3.2 Inflatable air bags are installed in the vehicles as safety equipment. In terms of momentum, what is the advantage of air bags over seatbelts?

Ans. As we know

$$F = \frac{\Delta p}{t}$$

According to this equation air bags in cars reduce the chance of injury because they increase time taken by human inside the car to change its momentum, thus force will decrease and chance of injury also decreases.

3.3 A horse refuses to pull a cart. The horse argues, "according to Newton's third law, whatever force I exert on the cart, the cart will exert an equal and opposite force on me. Since the net force will be zero, therefore, I have no chance of accelerating (pulling) the cart." What is wrong with this reasoning?

Ans. A horse pushes the earth in backward direction as an action and in reaction the earth pushes the horse in forward direction and the cart moves on. The wrong with the horse reasoning is that both forces are not acting on the same object but acting on two different objects so, the net force will not be zero therefore these forces will not be cancelled and acceleration will be produced.

3.4. When a cricket ball is hit high, a fielder tries to catch it. While holding the ball he/she draws hands backward. Why?

Ans. As we know

$$F = \frac{\Delta p}{t}$$

According to this equation when the fielder will draw his hands back, the chance of injury will reduce. Because time taken by the ball to change its momentum will increase which will decrease the force and chance of injury. Also by drawing his hands back the time of absorbing the kinetic energy of the ball will increase and this will decrease the chance of injury.

3.5. When someone jumps from a small boat onto the river bank, why does the jumper often fall into the water? Explain.

Ans. When someone jumps from a small boat onto the river bank, he applies action and by Newton's third law of motion an equal and opposite reaction on him may cause him to fall into the water.

3.6. Imagine that if friction vanishes suddenly from everything, then what could be the scenario of daily life activities?

Ans. If the friction vanishes suddenly then we can do nothing. We can not walk or write. We can not hold anything. Daily life will collapse.

D. Comprehensive Questions.

3.1. Explain the concept of force by practical examples?

Ans. **Force:** A force is a push or a pull that starts, stops or changes the magnitude and direction of velocity of a body.

Practical examples:

1. When we open a door, we push or pull it by applying force.

2. When we are sitting in a car we push against the seat as the car turns round a corner.

3. To move a wheelbarrow with its load, we apply force each handle when turning the wheelbarrow around the corner in order to keep it from tipping over.

4. The example of force acting on us is the force of gravity acting downward.

5. The force of friction helps us to walk on the ground and to write something on paper with pencil.

6. While kicking a ball we apply force on the ball.

7. To raise the hammer we apply force to do some task.

8. To open the cap of a bottle we apply force.

3.2. Describe Newton's laws of motion.

Ans. First law of motion:

Statement: "A body continues its state of rest or of uniform motion in a straight line unless acted upon by some external force."

Explanation: A book placed on a table remains there unless a force is applied to move it. A ball rolling on floor should continue to move with the same velocity in the absence of an applied force. But practically, we see that it is not true. The ball stops after covering some distance. In fact, an opposing force (friction) causes the ball to stop.

Law of inertia: Since Newton's first law of motion deals with inertial properties of matter so it is called law of inertia.

Second law of motion:

Statement: "If a net external force acts upon a body, it accelerates the body in the direction of force. The magnitude of acceleration is directly proportional to the magnitude of force and is inversely proportional to the mass of the body."

Explanation: If a net force of magnitude "F" acts on a body of mass m and produces an acceleration of magnitude a,

Mathematical form: The second law can be written mathematically as:

and $a \propto F$

$a \propto \frac{1}{m}$

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

or $a = (\text{constant})\frac{F}{m}$

According to Sl units, if m = 1 kg, a = $1ms^{-2}$, F = 1N, then the value of the constant will be 1. Therefore, the above equation can be written as:

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

$F = ma$

Third law of motion:

Statement: For every action, there is always an equal and opposite reaction.

Examples:

(i) Consider a block lying on a table. The block exerts a downward force on the table equal to its weight w. The table also exerts a reaction force F, on the block in upward direction.

(ii) When a bullet is fired from a gun, the bullet moves in the forward direction with a force F. This is the force of action. The gun recoils in the backward direction with a reaction force R.

3.3. Define momentum and express Newton's 2nd law of motion in terms of change in momentum.

Ans. Momentum: The momentum of a moving body is the product of its mass and velocity.

$$p = m \times v$$

Momentum and Newtons second law of motion:

Let a body of mass 'm' is moving with initial velocity Vi then its initial momentum is mVi. When a force acts on a body for a time Δt velocity changes to its final velocity $'V_f'$ and its final momentum is mv_f. This change in momentum in time Δt will be equal to the applied force.

Proof: Change in velocity = Final Velocity – Initial Velocity

$$\Delta v = V_f - 'V_i'$$

Change in momentum = Final Momentum – Initial Momentum

$$\Delta p = mv_f - mv_i$$

as $a = \frac{V_f - V_i}{\Delta t}$

and $F = ma$

so, $F = \frac{m(V_f - V_i)}{\Delta t}$

$F = \frac{mv_f - mv_i}{\Delta t}$

$F = \frac{\Delta p}{\Delta t}$

This is the final expression of newton's second law of motion in term of change in momentum.

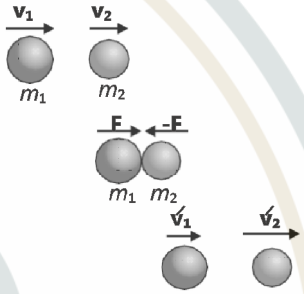
3.4. State and explain the principle of conservation of momentum.

Ans. Law of conservation of momentum

"If no net force acts on an isolated system, the total final momentum of the system is equal to the total initial momentum."

Explanation: Case-I When both bodies are moving:-

Consider a system of two balls of masses m_1 and m_2 moving along a straight line in same direction with velocities v_1 and v_2 and $v_1 > v_2$.



Their velocities changes to v_1' and v_2' after collision.

Total momentum of the system before collision = $m_1v_1 + m_2v_2$

Total momentum of the system after collision = $m_1v_1' + m_2v_2'$

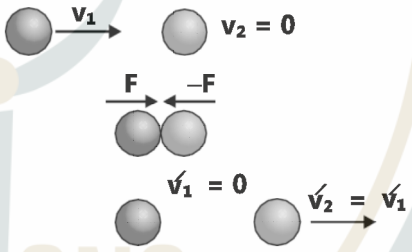
According to law of conservation of momentum

Total momentum of the system before collision = Total momentum of the system after collision

$m_1v_1 + m_2v_2 = m_1v_1' + m_2v_2'$

Case-II: When one ball is moving and one is at rest.

Consider a system of two identical balls where one ball is moving and the other is at rest. The velocity of first ball is v_1 and of second ball is $v_2 = 0$ before collision. After collision the first ball comes to rest i.e its velocity $v_1' = 0$ and second ball moves with a velocity of v_2'. In this collision the first ball transfers its momentum to the second ball.



According to law of conservation of momentum.

Total momentum of the system before collision = Total momentum of the system after collision

$m_1v_1 + m_2v_2 = m_1v_1' + m_2v_2'$

$m_1v_1 + 0 = 0 + m_2v_2'$

$m_1v_1 = m_2v_2'$

3.5. Describe the motion of a block on a table taking into account the friction between the two surfaces. What is the static friction and kinetic friction?

Ans. The friction between two solid surfaces is called sliding friction which can be divided into two categories.

1. Static friction **2.** Kinetic friction

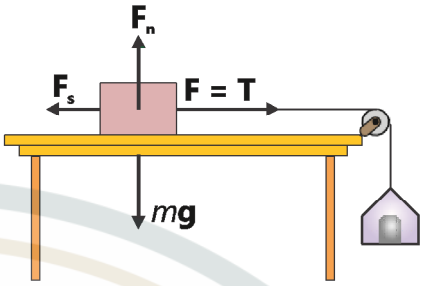
Ans. Static Friction: The resisting force between the two surfaces before the motion starts is called the static friction.

Explanation: Consider the motion of a block on a horizontal surface. When a weight is put in the

pan, a force F = T equal to the sum of this weight and weight of the pan acts on the block. This force tends to pull the block. At the same time an opposing force appears that does not let the block move. This opposing force is the static friction Fs.

Kinetic Friction: The force of friction arising due to applied external force after motion of one body over the other is called kinetic friction.

Explanation: If we go on adding more weights in the pan one by one in small steps, a stage will come when the block starts sliding on the horizontal surface. This is the limit of static friction that is equal to the total weights including pan. When the block is sliding, friction still exists. It is known as kinetic friction.



3.6. Explain the effect of friction on the motion of vehicles in context of tyre surface and braking force.

Ans. **Tyre surface:** To move a vehicle on the road as well as to stop a moving vehicle requires friction between its tyres and the road. For example, if the road is slippery or the tyres are worn out then the tyres instead of rolling, slip over the road due to lack of friction.

If road is dry and tyres are not worn out then vehicle will not slip and moves smoothly on the road and also can be stopped easily due to friction between tyre surface and road.

Braking: When we apply the brakes the brake pad presses with the brake drums. The force of friction between the brake pads and the brake drums stops the wheels. This braking force stops the vehicle.

E. Numerical Problems.

3.1. A 10 kg block is placed on a smooth horizontal surface. A horizontal force of 5 N is applied to the block. Find:
(a) the acceleration produced in the block.
(b) the velocity of block after 5 seconds.

Given Data:

$m = 10$ kg
$F = 5$ N

To find:

(a) $a = ?$
(b) $v_f = ?$
$t = 5$ s
$v_i = 0$

Sol:

(a)
$F = ma$
$a = \frac{F}{m}$
$a = \frac{5}{10}$
$a = 0.5\ ms^{-2}$

(b)
$v_f = v_i + at$
$v_f = 0 + (0.5)(5)$
$v_f = 2.5\ ms^{-1}$

Result: Acceleration produced is $0.5 ms^{-2}$ and velocity after 5 sec is $2.5 ms^{-1}$.

3.2. The mass of a person is 80 kg. What will be his weight on the Earth? What will be his weight on the Moon? The value of acceleration due to gravity of Moon is 1.6 ms^{-2}.

Given Data:

$m = 80$ kg
$g_e = 10\ ms^{-2}$
$g_m = 1.6\ ms^{-2}$

To find:

Weight on earth = $w_e = ?$
Weight on moon = $w_m = ?$

Sol:

$w_e = mg_e$
$w_e = 80 \times 10$
$w_e = 800$ N

Now,

$w_m = mg_m$
$w_m = 80 \times 1.6$
$w_m = 128$ N

Result: So, weight on earth and moon are 800 N and 128 N respectively.

3.3. What force is required to increase the velocity of 800 kg car from 10 m s^{-1} to 30 m s^{-1} in 10 seconds?

Given Data:

$m = 800$ kg
$v_i = 10$ ms^{-1}
$v_f = 30$ ms^{-1}
$t = 10$ sec

To find:

$F = ?$

Sol:

$$F = \frac{m(v_f - v_i)}{t}$$

$$F = \frac{800(30-10)}{10}$$

$F = 80(20)$
$F = 1600$ N

Result: So, the force required is 1600 N.

3.4. A5 g bullet is fired by a gun. The bullet moves with a velocity of 300 m s^{-1}. If the mass of the gun is 10 kg, find the recoil speed of the gun.

Given Data:

mass of bullet = $m_1 = 5$ g

$$m_1 = \frac{5}{1000} \text{ kg}$$

$m_1 = 0.005$ kg

Velocity of bullet = $v_1 = 300$ ms^{-1}
Mass of gun = $m_2 = 10$ kg

To find:

Recoil speed = $v_2 = ?$

Sol:

$$m_1v_1 + m_2v_2 = 0$$

$$m_2v_2 = -m_1v_1$$

$$v_2 = \frac{-m_1v_1}{m_2}$$

$$v_2 = \frac{-(0.005)(300)}{10}$$

$v_2 = -0.15$ ms^{-1}

Result: Hence recoil speed of gun is –0.15 ms^{-1}.

3.5. An astronaut weighs 70 kg. He throws a wrench of mass 300 g at a speed of 3.5 ms. Determine:

(a) the speed of astronaut as he recoils away from the wrench.

(b) the distance covered by the astronaut in 30 minutes.

Given Data:

mass of astronaut = $m_1 = 70$ kg
mass of wrench = $m_2 = 300$ g

$$m_2 = \frac{300}{1000} \text{ kg}$$

$m_2 = 0.3$ kg

Speed of wrench = $v_2 = 3.5$ ms^{-1}

To find:

(a) Speed of astronaut = v_1 = ?

(b) Distance covered = S = ?

$t = 30$ min

$t = 30 \times 60$ sec

$t = 1800$ sec

Sol: **(a)**

$$m_1v_1 + m_2v_2 = 0$$

$$m_1v_1 = -m_2v_2$$

$$v_1 = \frac{-m_2v_2}{m_1}$$

$$v_1 = \frac{-(0.3)(3.5)}{70}$$

$$v_1 = \frac{-1.05}{70}$$

$v_1 = -0.015\ ms^{-1}$

$v_1 = -1.5 \times 10^{-2}\ ms^{-1}$

(b)

$S = v_1 \times t$

$S = 0.015 \times 1800$

$S = 27$ m

Result: The speed of astronaut is $1.5 \times 10^{-2}\ ms^{-1}$ and distance travelled is 27m.

3.6. A 6.5×10^3 kg bogie of a goods train is moving with a velocity of 0.8 m s^{-1}. Another bogie of mass 9.2×10^3 kg coming from behind with a velocity of 1.2 m s^{-1} collides with the first one and couples to it. Find the common velocity of the two bogies after they become coupled.

Given Data:

$m_1 = 6.5 \times 10^3$ kg = 6500 kg

$v_1 = 0.8\ ms^{-1}$

$m_2 = 9.2 \times 10^3$ kg = 9200 kg

$v_2 = 1.2\ ms^{-1}$

To find:

Common velocity = v = ?

Sol: By law of conservation of momentum.

$$m_1v_1 + m_2v_2 = m_1v + m_2v$$

$$m_1v_1 + m_2v_2 = v(m_1 + m_2)$$

$$\frac{m_1v_1 + m_2v_2}{m_1 + m_2} = v$$

$$\frac{6500 \times 0.8 + 9200 \times 1.2}{6500 + 9200} = v$$

$$\frac{5200 + 11040}{15700} = v$$

$$\frac{16240}{15700} = v$$

$1.03 ms^{-1} = v$

Result: So, the common velocity is 1.03 ms^{-1}.

3.7. A cyclist weighing 55 kg rides a bicycle of mass 5 kg. He starts from rest and applies a force of 90 N for 8 seconds. Then he continues at a constant speed for another 8 seconds. Calculate the total distance travelled by the cyclist.

Given Data: $m_1 = 55$ kg

$m_2 = 5$ kg

Total mass = $m = m_1 + m_2$

$m = 55 \text{ kg} + 5 \text{ kg}$

$m = 60$ kg

$v_i = 0$

$F = 90$ N

$t_1 = 8$

$t_2 = 8$

To find: Total distance = S = ?

Sol: We will find distances for first 8 seconds and the for next 8 seconds say S_1 and S_2.

Now, $F = ma$

$$a = \frac{F}{m} = \frac{90}{60}$$

$a = 1.5 \text{ ms}^{-2}$

$v_f = v_i + at_1$

$v_f = 0 + (1.5)(8) = 12 \text{ ms}^{-1}$

Now, for 'S_1'

$$S_1 = v_i t_1 + \frac{1}{2} a (t_1)^2$$

$$S_1 = 0 \times 8 + \frac{1}{2}(1.5)(8)^2$$

$$S_1 = \frac{1}{2} \times 1.5 \times 64$$

$$S_1 = 48\text{m}$$

Now, for S_2 speed is constant

So, $S_2 = v_f \times t_2$

$S_2 = 12 \times 8$

$S_2 = 96$ m

And $S = S_1 + S_2$

$S = 48 \text{ m} + 96 \text{ m}$

$S = 144$ m

Result: So, total distance travelled by cyclist is 144 m.

3.8 A ball of mass 0.4 kg is dropped on the floor from a height of 1.8m. the ball rebounds straight upward to a height of 0.8 m. what is the magnitude and direction of the impulse applied to the ball by the floor?

Given data:

$m = 0.4$ kg

$h_1 = 1.8$ m

$h_2 = 0.8$ m

$g = 10 \text{ m/sec}^2$

To find: Δp = Impulse = ?

direction of impulse = ?

Sol: Velocity just hitting the floor (at height h_1)

$2gh_1 = v_f^2 - v_i^2$

$2 \times 10 \times 1.8 = v_f^2 - (0)^2$

$36 = v_f^2$

$\sqrt{36} = \sqrt{v_f^2}$

$v_f = 6\text{m/sec}$ ball is moving downward

Velocity just after rebouncing (at height h_2). As ball moves upward so,

$v_f' = 0$

$2gh_2 = v_f'^2 - v_i'^2$

$2 \times 10 \times 0.8 = (0)^2 - v_i'^2$

$-16 = -v_i'^2$

$16 = v_i'^2$

$v_i' = 4\ ms^{-1}$

As direction of motion of ball is changed after hitting the ground. So we will take one of the velocity -ve to show opposite direction.

Let $v_i' = 4\ ms^{-1}$

$\Delta v = v_f - v_i$

$\Delta v = 6 - (-4)$

$\Delta v = 6 + 4$

$\Delta v = 10\ ms^{-1}$

Now, $\Delta p = \text{Impulse} = m\Delta v$

$\Delta p = \text{Impulse} = 0.4 \times 10$

$\Delta p = \text{Impulse} = 4\ Ns$

Result: So, the magnified of impulse is 4 Ns and direction of the impulse is upward.

3.9 Two balls of masses 0.2 kg and 0.4 kg are moving towards each other with velocities 20m s^{-1} and 5 ms^{-1} respectively. After collision, the velocity of 0.2 kg ball becomes 6 m s^{-1}. What will be the velocity of 0.4 kg ball?

Given Data:

Before collision:

$m_1 = 0.2$ kg

$m_2 = 0.4$ kg

$v_1 = 20\ ms^{-1}$

$v_2 = -5\ ms^{-1}$ (Negative sign show opposite direction)

After collision:

$v_1' = 6\ ms^{-1}$

To find:

$v_2' = ?$

Sol: According to law of conservation of momentum.

Total momentum before collision = Total momentum after collision

$m_1v_1 + m_2v_2 = m_1v_1' + m_2v_2'$

$m_1v_1 + m_2v_2 - m_1v_1' = m_2v_2'$

$$\frac{m_1v_1 + m_2v_2 - m_2v_2'}{m_2} = v_2'$$

$$\frac{(0.2)(20) + (0.4)(-5) - (0.2)(6)}{0.4} = v_2'$$

$$\frac{4 + 2 - 1.2}{0.4} = v_2'$$

$$v_2' = \frac{0.8}{0.4}$$

$$v_2' = 2ms^{-1}$$

Result: The velocity of the ball with mass 0.4 kg is 2 ms^{-1}.

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OBJECTIVE TYPE
Multiple Choice Questions

1. To avoid confusion in a measurement we need:
A observation B experiment
c standard unit D all

2. The instrument that is most suitable for measuring the thickness of a few sheets of cardboard is a:
A metre rule
B measuring tape
C Vernier Callipers
d micrometer screw gauge

3. Least count of screw-gauge is:
A 1 mm B 0.1 mm
c 0.01 mm D 0.01 cm

4. One femtometre is equal to:
A 10^{-9}m b 10^{-15}m
C 10^{9}m D 10^{15}m

5. In printers type, one point is equal to:
a 0.35 mm B 0.3 mm
C 3 mm D 1 mm

6. A light year is a unit of:
A light B time
c distance D speed

7. The error that arises due to some definite rule is:
A Human error
B Random error
c Systematic error
D All of these

8. Which one is a non-physical quantity?
A distance B density
c colour D temperature

9. Accuracy in a measurement is:
a Closeness to true value
B Deviation from true value
C Smaller value
D Larger value

10. Volume of water consumed by you per day is estimated in:
A millilitre b litre
C kilogram D cubic metre

11. Two rods with lengths 12.321 cm and 10.3 cm are placed side by side, the difference in their lengths is:
A 2.02 cm B 2.0 cm
C 2 cm d 2.021 cm

12. Four students measure the diameter of a cylinder with Vernier Callipers. Which of the following readings is correct?
A 3.4 cm B 3.475 cm
c 3.47 cm D 3.5 cm

13. A body, changing its position is said to be:
A At rest b In motion
C has constant speed
D has constant velocity

14. If a body does not change its position with respect to some fixed point, then it will be in a state of:
a rest B motion
C uniform motion
D variable motion

15. To and fro motion about a fix point is called:
A Circular motion
B Random motion
c Vibratory motion
D Rotatory motion

16. A ball is dropped from the top of a tower, the distance covered by it in the first second is:
a 5 m B 10 m
C 50 m D 100 m

17. If rate of change of velocity is constant, then acceleration will be:
A Variable b Uniform
C Positive D Negative

18. The area under the speed-time graph is numerically equal to:
A velocity
B uniform velocity
C acceleration
d distance covered

19. The slope of distance-time graph is the measure of:
A sinθ B cosθ
C secθ d tanθ

20. Gradient of the speed-time graph is equal to:
A speed B velocity
c acceleration
D distance covered

21. Straight line rising upward in speed-time graph represents:
A Uniform speed
B Uniform velocity
c Uniform acceleration
D Variable velocity

22. Gradient of the distance-time graph is equal to the:
a speed B velocity
C distance covered
D acceleration

23. Line parallel to time axis in speed-time graph indicates that acceleration is:
A Maximum B Minimum
c Zero D Uniform

24. The range of strong nuclear force is:
a 10^{-14} m B 10^{-16} m
C 10^{-6} m D 10^{-7} m

25. When we kick a stone, we get hurt. This is due to:
A inertia B velocity
C momentum d reaction

26. Free body diagram is example of:
A Simple diagram
b Vector diagram
C Scalar diagram
D Complex diagram

27. Which of the following is a non-contact force?
A Friction
B Air resistance
c Electrostatic force
D Tension in the string

88. The speed of bullet train:
A 100 km/h B 200 km/h
C 300 km/h d 400 km/h

89. Permeability is the ability of a material to allow:
A electric flux
B electric current
c magnetic flux
D electric field

90. Time passes slowly for an observer moving at:
A slow speed B high speed
C constant speed
d ultra high speed

91. Physics is a branch of:
A Social science
B Life science
c Physical science
D Biological science

92. Pressure horn is an example of:
a acoustics B optics
C atomic physics
D mechanics

93. Automobile technology is based on:
A Acoustics
B Electromagnetism
C Optics
d Thermodynamics

94. MRI deals with the study of:
A biophysics
b medical physics
C solid state physics
D astro physics

95. The working of refrigeration and air conditioning involves
A Electromagnetism
B Mechanics
C Climate science
d Thermodynamics

96. Complex issues and challenges are addressed by:
A physics B chemistry
C maths
d collaboration of science

97. The statement "If I do not study for this test, then I will not get good grade" is an example of:
A Theory B Observation
c Prediction D Law

98. A hypothesis is a:
A random idea
B proved fact
C only guess
d guess based on observation

99. A graph of an organized data is an example of:
A Collecting data
B Forming a hypothesis
C Asking question
d Analyzing data

100. The colour of a door is brown, is an example of:
a Observation
B Hypothesis
C Prediction D Law

Short Questions

1. Does a non-physical quantities have dimension?
Ans. See on page No. 03

2. Can a non-physical quantity be measured? If yes, then how?
Ans. See on page No. 11

3. What is meant by international system (SI) of units?
Ans. See on page No. 04

4. What is measurement? Name its two parts.
Ans. See on page No. 11

5. Define zero error of verneir callipers. Write its least count?
Ans. See on page No. 05

6. Why do we need a standard unit for measurements?
Ans. See on page No. 11

7. What is a stop-watch? Write its types and least count?
Ans. See on page No. 05

8. Write the name of 3 base quantities and 3 derived quantities.
Ans. See on page No. 11

9. How volume of a liquid can be measured using measuring cylinder?
Ans. See on page No. 06

10. Why prefix is used? Name three sub-multiples and three multiple prefixes with their symbols.
Ans. See on page No. 12

11. Why we need to measure error in a measurement?
Ans. See on page No. 06

12. Differentiate between precision and accuracy.
Ans. See on page No. 08

13. Define rest and motion with example.
Ans. See on page No. 19

14. Define scalar and vector quantities.
Ans. See on page No. 28

15. What is translatory motion?
Ans. See on page No. 20

16. Give 5 examples each for scalar and vector quantities.
Ans. See on page No. 28

17. What is the difference between uniform velocity and non-uniform velocity?
Ans. See on page No. 21

18. What are distance-time graph and speed-time graph?
Ans. See on page No. 28

19. Write types of acceleration.
Ans. See on page No. 22

20. The vector quantities are sometimes written in scalar notation (not bold face). How is the direction indicated?
Ans. See on page No. 29

21. Explain speed time-graph.
Ans. See on page No. 23

22. Is it possible for a body to have acceleration? When moving with: (i) constant velocity (ii) constant speed
Ans. See on page No. 29

23. What assumptions should be followed to apply equation of motion?
Ans. See on page No. 25

24. What do you mean by electrostatic force and strong and weak nuclear force.
Ans. See on page No. 37

25. What kind of changes may be produced by a force?
Ans. See on page No. 45

26. Explain the unification of weak nuclear and electromagnetic forces?
Ans. See on page No. 38

27. Give 5 examples of contact forces.
Ans. See on page No. 45

28. Define 1 Newton force.
Ans. See on page No. 39

29. Define impulse of force.
Ans. See on page No. 45

30. What is gravitational field strength? Write its value?
Ans. See on page No. 39

31. The force expressed in Newton's second law is a net force. Why is it so?
Ans. See on page No. 46

32. How weight of an object is measured with the help of force meter?
Ans. See on page No. 40

33. Define terminal velocity of an object.
Ans. See on page No. 46

34. Why crumple zones are made in front and behind the main body of the vehicles?
Ans. See on page No. 41

35. Define resultant force.
Ans. See on page No. 55

36. What are rectangular components of a vector and their values?
Ans. See on page No. 63

37. Why does window handles are always installed at a larger distances from hinges?
Ans. See on page No. 56

38. Define moment of a force. Prove that $\tau = rF\sin\theta$, where θ is angle between r and F.
Ans. See on page No. 63

39. Define trigonometry.
Ans. See on page No. 56

40. With the help of a diagram, show that the resultant forces is zero but the resultant torque is not zero.
Ans. See on page No. 64

41. How centre of gravity of an irregular shaped plane lamina can be found?
Ans. See on page No. 57

42. Define centre of mass and centre of gravity of a body.
Ans. See on page No. 64

43. What is second condition of equilibrium?
Ans. See on page No. 58

44. How can you prove that the centripetal force always acts perpendicular to velocity?
Ans. See on page No. 64

45. Define like and unlike parallel forces.
Ans. See on page No. 63

46. Define one joule, the unit of work.
Ans. See on page No. 71

47. What is the work done on an object that remains at rest when a force is applied on it?
Ans. See on page No. 79

48. Define potential energy.
Ans. See on page No. 72

49. A force F_1 does 5 J of work in 10 s. Another force F_2 does 3 J of work in 5 s. Which force delivers greater power?
Ans. See on page No. 79

50. Explain fossil-fuel energy.
Ans. See on page No. 73

51. Define work and its Sl unit.
Ans. See on page No. 80

52. What is biomass? How biofuel energy is used to generate electricity?
Ans. See on page No. 73

53. Find an expression for the kinetic energy of a moving body.
Ans. See on page No. 80

54. What are harmful effects of fossil fuels and nuclear fuels?
Ans. See on page No. 74

55. Differentiate between renewable and non-renewable energy sources.
Ans. See on page No. 81

56. Define power. Also write its formula and unit.
Ans. See on page No. 75

57. Define elastic limit?
Ans. See on page No. 90

58. Why heavy animals like an elephant have a large area of the foot?
Ans. See on page No. 97

59. Why density of iron is greater than the density of wood?
Ans. See on page No. 91

60. Why is it painful to walk bare footed on pebbles?
Ans. See on page No. 97

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MODEL PAPERS

CLASS TEST

Class Test # 3	Physics-9	SYLLABUS: Unit: 3	Objective Type	Time: 12 Min.	Marks: 10

1. Choose the correct answer. **(1×10=10)**

1. Non-contact force is also called:
A Friction B Thrust C Field force D Drag

2. The number of fundamental forces in nature:
A 2 B 3 C 4 D 5

3. External force acts on body:
A Friction B Gravity C Drag D All

4. Inertia depends on:
A Force B Weight C Mass D Speed

5. Relativistic mechanics was developed by:
A Newton B Fleming C Einstein D Henry

6. Weight is measured by:
A Ordinary balance B Physical balance C Lever balance D Spring balance

7. The weight of 100 g is equal to:
A 1N B 3N C 2N D 4N

8. Which friction is the smallest:
A Sliding friction B Static friction C Kinetic friction D Rolling friction

9. Rate of change of momentum is equal to:
A Inertia B Acceleration C Pressure D Force

10. Principle of conservation of momentum is applicable for:
A Macro objects B Atom C Molecules D All of these

✂---------- PTO

Class Test # 4	Physics-9	SYLLABUS: Unit: 4	Objective Type	Time: 12 Min.	Marks: 10

1. Choose the correct answer. **(1×10=10)**

1. Unit of torque is:
A Nm B Nm^{-1} C Nm^{-2} D Ns

2. The number of perpendicular components of a force:
A 1 B 4 C 5 D 2

3. Metre rule is balanced by using:
A Newton's laws B Principle of moment
C Principle of conservation of momentum D Principle of induction

4. Centre of gravity of a bow is:
A Inside the material B Outside the material
C At the bottom of material D All

5. A body in equilibrium has no:
A Speed B Motion C Distance D Acceleration

6. There are conditions of equilibrium:
A 2 B 3 C 4 D 5

7. Ball rolling on a surface is an example of:
A Stable equilibrium B Unstable equilibrium
C Neutral equilibrium D Complete equilibrium

8. If the heavy loads are placed on the floor of the bus, its centre of gravity will be:
A low B high C zero D constant

9. Moon revolves around the earth due to:
A Magnetic force B Contact force C Centripetal force D Centrifugal force

10. The point where whole weight of a body acts is:
A In-centre B Orthocenter C Centre of mass D Centre of gravity

Class Test # 3	Physics-9	SYLLABUS: Unit: 3	Subjective Type	Time: 28 Min.	Marks: 30

2. Give short answer to the following questions. (2×10=20)

i. Define air resistance, tension force and elastic force.

ii. Explain the unification of weak nuclear and electromagnetic forces?

iii. How many external forces act on body? Give examples.

iv. When the table cloth is pulled abruptly, the objects remain in their original position on the table. Why?

v. What are the limitations of Newton's laws of motion?

vi. Why does weight of a body varies from place to place?

vii. Define electronic balance. Write its working.

viii. What is hovercraft? How does it move?

ix. Why crumple zones are made in front and behind the main body of the vehicles?

x. What is purpose of seatbelt in vehicles?

3. Attempt the following questions. (2×5=10)

i. Describe Newton's laws of motion.

ii. State and explain the principle of conservation of momentum.

Class Test # 4	Physics-9	SYLLABUS: Unit: 4	Subjective Type	Time: 28 Min.	Marks: 30

2. Give short answer to the following questions. (2×10=20)

i. Write the types of parallel forces.

ii. Define resultant force.

iii. Why does window handles are always installed at a larger distances from hinges?

iv. Define components of vector. How components of a vector can be drawn?

v. State principle of moments? Write its equation.

vi. How centre of gravity of an irregular shaped plane lamina can be found?

vii. Define the types of equilibrium with examples.

viii. What is second condition of equilibrium?

ix. Define unstable equilibrium.

x. How the position of the gravity is important? Give example.

3. Attempt the following questions. (2×5=10)

i. Describe how could you determine the centre of gravity of an irregular shaped lamina experimentally.

ii. How the stability of an object can be improved? Give a few examples to support your answer.

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MODEL PAPERS

ASSESSMENT TEST

CHAPTER WISE

Assessment Chapterwise Test 5	Syllabus: Unit 5	Objective Type	Time: 15 Min.	Marks: 12

Q1. Choose the correct option and fill the bubble. **1 × 12 = 12**

1. 1 MJ = _____

A 10^3 J B 10^6 J C 10^9 J D 100000 J

2. A joule can also be written as:

A kg m s^{-2} B kg m s^{-1} C kg m^2s^{-3} D kg m^2s^{-2}

3. The energy output of a power station in one year is:

A 10^8 J B 10^{16} J C 10^3 J D 10 MJ

4. The power of a water pump is 2 kW. The amount of water it can raise in one minute to a height of 5 metres is:

A 1000 litres B 1200 litres C 2000 litres D 2400 liters

5. Metal plates of solar panels are painted:

A brown B black C red D green

6. A bullet of mass 0.05 kg has a speed of 300 m s^{-1}. Its kinetic energy will be:

A 2250 J B 4500 J C 1500 J D 1125 J

7. Non-renewable source of energy is:

A wind energy B wave energy C solar energy D nuclear energy

8. The energy possessed by a body by virtue of its position is:

A kinetic energy B potential energy
C chemical energy D solar energy

9. 746 w of power is equal to:

A 1hp B 2hp C 1.5hp D 2.5hp

10. The magnitude of momentum of an object is doubled, the kinetic energy of the object will:

A double B increase to four times
C reduce to one-half D remain the same

11. Efficiency of electric motor is:

A 35% B 15% C 80% D 55%

12. Which of the following is not a renewable energy source?

A Hydroelectric energy B Fossil fuels
C Wind energy D Solar energy

Assessment Chapterwise Test 5	Syllabus: Unit 5	Subjective Type	Time: 1:45 Min.	Marks: 48

(Section - I)

Q2. Write short answers to any FIVE (5) questions. (5 × 2 = 10)

(i) Define work. Write its formula and its S.I unit.
(ii) Can the kinetic energy of a body ever be negative?
(iii) Define one joule, the unit of work.
(iv) What is the work done on an object that remains at rest when a force is applied on it?
(v) Define mechanical energy. Write the names of its types.
(vi) Define nuclear energy and nuclear fission.
(vii) State the law of conservation of energy. Explain with one example.
(viii) Define work and its Sl unit.

Q3. Write short answers to any FIVE (5) questions. (5 × 2 = 10)

(i) Name different forms of energy?
(ii) Comment on the statement. "An object has one joule of potential energy."
(iii) Define solar energy. Write its uses.
(iv) Find an expression for the kinetic energy of a moving body.
(v) What is nuclear energy and how it is produced?
(vi) What is geothermal energy?
(vii) What is biomass? How biofuel energy is used to generate electricity?
(viii) What is power? Define the unit used for it.

Q4. Write short answers to any FIVE (5) questions. (5 × 2 = 10)

(i) Which is the most preferred form of energy and why?
(ii) Is timber or wood a renewable source of heat energy? Comment.
(iii) What are harmful effects of fossil fuels and nuclear fuels?
(iv) Define efficiency of a working system. Why a system cannot have 100% efficiency?
(v) Define power. Also write its formula and unit.
(vi) Define unit of power.
(vii) What is an ideal machine and why it is not possible to make an ideal or perpetual machine?
(viii) Differentiate between renewable and non-renewable energy sources.

(Section - II)

Note: Attempt TWO question in all.

Q5. (a) What is meant by kinetic energy? State its unit. Describe how it is determined. **4**

(b) A force of 20 N acting at an angle of 60° to the horizontal is used to pull a box through a distance of 3 m across a floor. How much work is done? **5**

Q6. (a) Explain what is meant by efficiency of a machine. How is it calculated? Why there is a limit for the efficiency of a machine? **4**

(b) An engine raises 100 kg of water through a height of 80 m in 25 s. What is the power of the engine? **5**

Q7. (a) State the law of conservation of energy. Explain it with the help of an example of a body falling from certain height in terms of its potential energy and kinetic energy. **4**

(b) A ball of mass 160 g is thrown vertically upward. The ball reaches a height of 20 m. Find the potential energy gained by the ball at this height. **5**

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MODEL PAPERS

ASSESSMENT TEST

1ST HALF

Assessment Chapterwise Test 8	Syllabus: First Half Unit 1 to 4	Objective Type	Time: 15 Min.	Marks: 12

Q1. Choose the correct option and fill the bubble. **1 × 12 = 12**

1. A light year is a unit of:

A light B time C distance D speed

2. Least count of electronic watches is:

A 0.1 sec B 0.01 sec C 0.001 sec D 1 sec

3. Which of the following measures are likely to represent the thickness of a sheet of this book?

A 6×10^{-25} m B 1×10^{-4} m C 1.2×10^{-15} m D 4×10^{-2} m

4. The unit of speed is:

A Kg B ms^{-1} C ms^{-2} D cm

5. Gradient of the speed-time graph is equal to:

A speed B velocity
C acceleration D distance covered

6. Straight line rising upward in speed-time graph represents:

A Uniform speed B Uniform velocity
C Uniform acceleration D Variable velocity

7. A ball with initial momentum p hits a solid wall and bounces back with the same velocity. Its momentum p after collision will be:

A $p' = p$ B $p' = -p$ C $p' = 2p$ D $p' = -2p$

8. The product F.Δt is called:

A Momentum B Impulse C Inertia D Elasticity

9. Collection of objects is called:

A Molecule B System C Ideas system D Compound

10. The value of cos0° is:

A 1 B 0.5 C 0.866 D 0

11. Moment of force is called:

A moment arm B couple C couple arm D torque

12. In stable equilibrium the centre of gravity of the body lies:

A at the highest position B at the lowest position
C at any position D outside the body

Assessment Chapterwise Test 8	Syllabus: First Half Unit 1 to 4	Subjective Type	Time: 1 hour 45 Min.	Marks: 48

(Section - I)

Q2. Write short answers to any FIVE (5) questions. (5 × 2 = 10)

(i) Can a non-physical quantity be measured? If yes, then how?
(ii) What is a stop-watch? Write its types and least count?
(iii) Distance and displacement may or may not be equal in magnitude. Explain this statement.
(iv) The car while moving on a circular road may have constant speed, but its velocity is changing at every instant. Why?
(v) Imagine that if friction vanishes suddenly from everything, then what could be the scenario of daily life activities?
(vi) What do you mean by gravitational force?
(vii) Define parallel forces.
(viii) Define couple. Give examples.

Q3. Write short answers to any FIVE (5) questions. (5 × 2 = 10)

(i) What is measuring cylinder?
(ii) What is meant by. (a) 5 pm (b) 15 ns (c) 6 μm (d) 5 fs
(iii) How average speed of a body is measured by measuring gradient of a distance-time graph?
(iv) Explain speed time-graph when object is moving with uniformly changing speed (uniform acceleration).
(v) Define impulse of force.
(vi) How weight of an object is measured with the help of force meter?
(vii) Define moment of a force. Prove that $\tau = rF\sin\theta$, where θ is angle between r and F.
(viii) Define stable equilibrium.

Q4. Write short answers to any FIVE (5) questions. (5 × 2 = 10)

(i) What is measurement? Name its two parts.
(ii) It is difficult to locate the meniscus in a wider vessel. Why?
(iii) Write equations of motion.
(iv) What is free fall acceleration or gravitational acceleration? Write its value.
(v) Why fragile objects are packed in soft materials like styrofoam boxes?
(vi) Define terminal velocity of an object.
(vii) Define like and unlike parallel forces.
(viii) What is centripetal force? Write its formula.

(Section - II)

Note: Attempt TWO question in all.

Q5. (a) What is meant by base and derived quantities? Give the names and symbols of SI base units. **4**
(b) Express the density of mercury given as 13.6 g cm^{-3} in kg m^{-3}. **5**

Q6. (a) How equations of motion can be applied to the bodies moving under the action of gravity? **4**
(b) A stone is dropped from a height of 45 m. How long will it take to reach the ground? What will be its velocity just before hitting the ground? **5**

Q7. (a) State and explain two conditions of equilibrium. **4**
(b) A 5 g bullet is fired by a gun. The bullet moves with a velocity of 300 m s^{-1}. If the mass of the gun is 10 kg, find the recoil speed of the gun. **5**

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MODEL PAPERS

ASSESSMENT TEST

2ND HALF

Assessment Chapterwise Test 9	Syllabus: Second Half Unit 5 to 9	Objective Type	Time: 15 Min.	Marks: 12

Q1. Choose the correct option and fill the bubble. **1 × 12 = 12**

1. The energy output of a power station in one year is:

A 10^8 J B 10^{16} J C 10^3 J D 10 MJ

2. A bullet of mass 0.05 kg has a speed of 300 m s^{-1}. Its kinetic energy will be:

A 2250 J B 4500 J C 1500 J D 1125 J

3. The energy possessed by a body by virtue of its position is:

A kinetic energy B potential energy
C chemical energy D solar energy

4. Efficiency of electric motor is:

A 35% B 15% C 80% D 55%

5. The principle of a hydraulic press is based on:

A Hooke's law B Pascal's law
C Principle of conservation of energy
D Principle of conservation of momentum

6. Pressure applied at any point in an enclosed fluid transmitted equally to all parts of fluid without loos; refers to:

A Snell's law B Pascal's law C Hooke's law D Faraday's law

7. What type of motion is of the molecules in a gas?

A Linear motion B Random motion
C Vibratory motion D Rotatory motion

8. Range of clinical thermometer is:

A 35°C to 40°C B 35°C to 38°C C 35°C to 45°C D 35°C to 50°C

9. Which one of the following is not a magnetic material?

A Cobalt B Iron C Aluminium D Nickel

10. Permanent magnets are used in:

A circuit breaker B loudspeaker
C electric crane D magnetic recording

11. Time passes slowly for an observer moving at:

A slow speed B high speed C constant speed D ultra high speed

12. The working of refrigeration and air conditioning involves:

A Electromagnetism B Mechanics
C Climate science D Thermodynamics

Assessment Chapterwise Test 9	Syllabus: Second Half Unit 5 to 9	Subjective Type	Time: 1 hour 45 Min.	Marks: 48

(Section - I)

Q2. Write short answers to any FIVE (5) questions. (5 × 2 = 10)

(i) Define one joule, the unit of work.
(ii) Define mechanical energy. Write the names of its types.
(iii) Define work and its SI unit.
(iv) Define 1 atmosphere pressure (1 atm)? Write value of standard atmospheric pressure (1 atm)?
(v) Why plasma is called a fourth state of matter?
(vi) What are the reasons that gases have neither a fixed volume nor a fixed shape?
(vii) How magnetic compass is used in navigation.
(viii) Define magnetic field of a magnet.

Q3. Write short answers to any FIVE (5) questions. (5 × 2 = 10)

(i) Name different forms of energy?
(ii) Find an expression for the kinetic energy of a moving body.
(iii) What is biomass? How biofuel energy is used to generate electricity?
(iv) The top of a thumb pin is flat but the end is very sharp. Why?
(v) State Pascal's law. Give an application of Pascal's law.
(vi) What is thermocouple thermometer?
(vii) What is the basis of laser technology?
(viii) Write some uses of permanent magnets?

Q4. Write short answers to any FIVE (5) questions. (5 × 2 = 10)

(i) Define efficiency of a working system. Why a system cannot have 100% efficiency?
(ii) Define unit of power.
(iii) State what do you mean by elasticity of a solid.
(iv) What do you mean by linearity of a thermometer?
(v) What is scientific method?
(vi) What is a hypothesis? Give one example.
(vii) Differentiate between paramagnetic and diamagnetic materials.
(viii) What do you mean by predication?

(Section - II)

Note: Attempt TWO question in all.

Q5. (a) Explain what is meant by efficiency of a machine. How is it calculated? Why there is a limit for the efficiency of a machine? **4**

(b) A force of 20 N acting at an angle of 60° to the horizontal is used to pull a box through a distance of 3 m across a floor. How much work is done? **5**

Q6. (a) What is temperature? How is it measured? Describe briefly the construction of a mercury-in-glass thermometer. **4**

(b) A ball of mass 160 g is thrown vertically upward. The ball reaches a height of 20 m. Find the potential energy gained by the ball at this height. **5**

Q7. (a) What is the scope of physics in everyday life? Give some examples? **4**

(b) Find the water pressure on a deep-sea diver at a depth of 10 m, where the density of sea water is 1030 kg m^{-3}. **5**

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ASSESSMENT TEST

FULL BOOK

Assessment Chapterwise Test 10	Syllabus: Unit 1 to 9	Objective Type	Time: 15 Min.	Marks: 12

Q1. Choose the correct option and fill the bubble. **1 × 12 = 12**

1. Paratrooper moves down with:

A Uniform Speed B Constant Speed
C Terminal Velocity D Instantaneous Velocity

2. There are conditions of equilibrium:

A 2 B 3 C 4 D 5

3. Atmospheric pressure is 55 kPa at a height of:

A 5 km B 10 km C 20 km D 50 km

4. A thermometer is evaluated by:

A sensitivity B linearity C range D all of these

5. Volume of water consumed by you per day is estimated in:

A millilitre B litre C kilogram D cubic metre

6. Gradient of distance, time graph represents:

A Uniform speed B Average speed C Variable speed D Uniform velocity

7. Which of the following is a non-contact force?

A Friction B Air resistance
C Electrostatic force D Tension in the string

8. The parallel forces which have opposite direction are:

A Mutual forces B Basic forces
C Like parallel forces D Unlike parallel forces

9. Non-renewable source of energy is:

A wind energy B wave energy C solar energy D nuclear energy

10. Heat is the:

A total kinetic energy of the molecules B the internal energy
C work done by the molecules D energy in transit

11. The best material to protect a device from external magnetic field is:

A Wood B plastic C steel D soft iron

12. Which distinguishes between scientific theories and pretended beliefs:

A hypothesis B prediction C law D falsifiability

Assessment Chapterwise Test 10	Syllabus: Unit 1 to 9	Subjective Type	Time: 1:45 Min.	Marks: 48

(Section - I)

Q2. Write short answers to any FIVE (5) questions. (5 × 2 = 10)

(i) Write the names of six prefixes most commonly used?
(ii) Differentiate between distance and displacement?
(iii) What is hovercraft? How does it move?
(iv) What is second condition of equilibrium?
(v) What is wind energy? Write its uses.
(vi) How meteorologist forecast weather condition?
(vii) What do you mean by range of a thermometer?
(viii) Write steps of scientific method.

Q3. Write short answers to any FIVE (5) questions. (5 × 2 = 10)

(i) Write the name of 3 base quantities and 3 derived quantities.
(ii) How a vector is represented graphically?
(iii) What are distance-time graph and speed-time graph?
(iv) What are strong nuclear forces? Explain.
(v) Define equilibrium.
(vi) What is power? Define the unit used for it.
(vii) Show that liquid pressure act in all directions?
(viii) What is meant by hypothesis?

Q4. Write short answers to any FIVE (5) questions. (5 × 2 = 10)

(i) Why do we need a standard unit for measurements?
(ii) What are significant figures?
(iii) What is a distance-time graph?
(iv) How energy is dissipated during friction?
(v) Define circular motion. Give example.
(vi) Define work. Write its formula and its S.I unit.
(vii) Describe the main scales used for the measurement of temperature. How are they related with each other?
(viii) Differentiate between temporary and permanent magnets?

(Section - II)

Note: Attempt TWO question in all.

Q5. (a) Differentiate between precision and accuracy of a measurement with examples. **4**

(b) A car passes a green traffic signal while moving with a velocity of 5 ms^{-1}. It then accelerates to 1.5 m s^{-2}. What is the velocity of car after 5 seconds? **5**

Q6. (a) Describe the motion of a block on a table taking into account the friction between the two surfaces. What is the static friction and kinetic friction? **4**

(b) A force of 200 N is acting on a cart at an angle of 30° with the horizontal direction. Find the x and y-components of the force. **5**

Q7. (a) What is scientific method? Describe its main stages with examples. **4**

(b) The mass of 5 litres of milk is 4.5 kg. Find its density in SI units. **5**

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MODEL PAPERS

ASSESSMENT TEST

ANSWERS

Solved Assessment Papers

Assessment Test No.1

1. C standard unit
2. D micrometer screw gauge
3. B 4×10^{-5} **4.** C distance
5. B 1 mm **6.** B litre
7. B 0.01 sec **8.** D 2.021 cm
9. C Systematic error
10. B 1×10^{-4} m
11. A Closeness to true value
12. B 10^{-15}m

Note: *See the Reading Material for Answers to the Subjective Type Questions*

Assessment Test No.2

1. C Relative **2.** A rest
3. C 3 **4.** A 5 m
5. B ms^{-1}
6. D distance covered
7. D x-axis **8.** C acceleration
9. B Average speed
10. A speed
11. C Uniform acceleration
12. D equal to or less than one

Note: *See the Reading Material for Answers to the Subjective Type Questions*

Assessment Test No.3

1. A 10^{-14} m **2.** D reaction
3. B 1 $kgms^{-2}$
4. C Electrostatic force
5. B N **6.** B $p' = -p$
7. C Electronic balance
8. C Newton's third law of motion
9. B Impulse **10.** C –12 N
11. B System
12. C prevents direct contact of the surfaces

Note: *See the Reading Material for Answers to the Subjective Type Questions*

Assessment Test No.4

1. D Unlike parallel forces
2. B between 1 N and 7 N
3. A 1 **4.** B F sin60°
5. A Centre **6.** D torque
7. A $\Sigma F = 0, \Sigma\tau = 0$
8. B at the lowest position
9. D along tangent
10. A $\sum \mathbf{F} = 0$ and $\sum\tau = 0$
11. C Equilibrium
12. C $\frac{mv^2}{r}$

Note: *See the Reading Material for Answers to the Subjective Type Questions*

Assessment Test No.5

1. B 10^6 J **2.** D kg m^2s^{-2}
3. B 10^{16} J **4.** D 2400 liters
5. B black **6.** A 2250 J
7. D nuclear energy
8. B potential energy
9. A 1hp
10. B increase to four times
11. C 80% **12.** B Fossil fuels

Note: *See the Reading Material for Answers to the Subjective Type Questions*

Assessment Test No.6

1. B density **2.** B Pascal's law
3. C atmosphere **4.** D four times
5. B Pascal's law **6.** A 20 kN
7. D plasma
8. B Random motion
9. B –273.15°C

Solved Assessment Papers

10. D energy in transit
11. C 35°C to 45°C
12. C Expand linearly

Note: *See the Reading Material for Answers to the Subjective Type Questions*

Assessment Test No.7

1. B repel **2.** C Aluminium
3. C vanishes **4.** B loudspeaker
5. D 10^{16} **6.** D soft iron
7. D ultra high speed
8. D Thermodynamics
9. B geophysics
10. D Thermodynamics
11. D falsifiability
12. D Analyzing data

Note: *See the Reading Material for Answers to the Subjective Type Questions*

First Half Book Assessment

Assessment Test No.8

1. C distance **2.** B 0.01 sec
3. B 1×10^{-4} m **4.** B ms^{-1}
5. C acceleration
6. C Uniform acceleration
7. B $p' = -p$ **8.** B Impulse
9. B System **10.** A 1
11. D torque
12. B at the lowest position

Note: *See the Reading Material for Answers to the Subjective Type Questions*

Second Half Book Assessment

Test No.9

1. B 10^{16} J **2.** A 2250 J
3. B potential energy
4. C 80% **5.** B Pascal's law
6. B Pascal's law
7. B Random motion
8. C 35°C to 45°C
9. C Aluminium **10.** B loudspeaker
11. D ultra high speed
12. D Thermodynamics

Note: *See the Reading Material for Answers to the Subjective Type Questions*

Full Book Assessment Test No.10

1. C Terminal Velocity
2. A 2 **3.** A 5 km
4. D all of these **5.** B litre
6. B Average speed
7. C Electrostatic force
8. D Unlike parallel forces
9. D nuclear energy
10. D energy in transit
11. D soft iron **12.** D falsifiability

Note: *See the Reading Material for Answers to the Subjective Type Questions*

Full Book Assessment Test No.11

1. B Levers
2. D Spring balance
3. A 23 w
4. B thermal energy
5. D all of these
6. A astrophysics
7. D distance covered
8. C Electronic balance
9. B F sin60° **10.** A 1hp
11. B –273.15°C
12. D Thermodynamics

Note: *See the Reading Material for Answers to the Subjective Type Questions*

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- چیپٹر وائز پیپرز
- فرسٹ ہاف بُک پیپرز
- سیکنڈ ہاف بُک پیپرز
- فل بُک پیپرز

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