CBT CLASS IX SCIENCE OCTOBER (2024)

GENERAL INSTRUCTIONS
TOTAL NO. OF QUESTIONS 10 QUESTIONS.
ALL QUESTIONS ARE COMPULSORY.

1. According to the third law of motion, action and reaction
a)always act on the same body
b) always act on different bodies in opposite directions
c) have same magnitude and directions
d) act on either body at normal to each other

2.A goalkeeper in a game of football pulls his hands backwards after holding the ball shot at the goal. This enables the goal keeper to
a) exert larger force on the ball
b) reduce the force exerted by the ball on hands
c) increase the rate of change of momentum
d) all of the above

3.A passenger in a moving train tosses a coin which falls behind him. It means that motion of the train is
a)accelerated
b) uniform
c) retarded
d) along circular tracks

4.A water tanker filled up to 23 of its height is moving with a uniform speed. On sudden application of the brake, the water in the tank would....
a) move backward
b) move forward
c) be unaffected
d) rise upwards

5**. An object of mass 2 kg is sliding with a constant velocity of 4 m s–1 on a frictionless horizontal table. The force required to keep the object moving with the same velocity is...**
a)32 N
b)0 N
c)2 N
d)0 N

6. Two objects of different masses falling freely near the surface of moon would
a) have same velocities at any instant
b) have different accelerations
c) experience forces of same magnitude
d) undergo a change in their inertia

7. The value of acceleration due to gravity
a) same on equator and poles
b) is least on poles
c) is least on equator
d) increases from pole to equator

8. The gravitational force between two objects is F. If masses of both objects are halved without changing distance between them, then the gravitational force would become
a) F/4
b) F/2
c) F
d) 2F

9.A boy is whirling a stone tied with a string in an horizontal circular path. If the string breaks, the stone
a) will continue to move in the circular path
b) will move along a straight line towards the centre of the circular path
c) will move along a straight line tangential to the circular path
d) will move along a straight line perpendicular to the circular path away from the boy

10.Law of gravitation gives the gravitational force between
a) the earth and a point mass only

b) the earth and Sun only
c) any two bodies having some mass
d) two charged bodies only

ANSWERS (WITH EXPLANATION)

1 b) always act on different bodies in opposite directions
Explanation : Newton's third law of motion states when we exert a force on a body, we also experience a force that is equal in magnitude in the opposite direction of the force which is exerted by us. Thus, the action and reaction force work on two different bodies in opposite direction and has the same magnitude.
2 b) reduce the force exerted by the ball on hands
Explanation : After holding the ball, the goalkeeper pulls his hands backward to slow down the rate of change of momentum while increasing the time.
The force is directly related to the rate of change of momentum, this allows less force to be exerted on his hands if he moves his hands backward.
3 a)accelerated
Explanation : If the coin falls behind the passenger that means the train is accelerated. When the coin is tossed it has same velocity as that of train but during the time it is in air its velocity becomes less than that of train (because the train is accelerated), so it falls behind the passenger.
4 b) move forward
Explanation : Inertia is the resistance of any physical object to any change in its state of motion, including changes to its speed and direction. It is the tendency of objects to keep moving in a straight line at constant velocity.
On sudden application of brakes on the water tank, the water tank decelerates or may even stop but the water in the tank still has a tendency to move forward due to inertia. Hence the water in the tank would move forward.
A water tanker filled up to two-thirds of its height moving with a uniform speed, on sudden application of the brake, the water in the tank would move forward.
5 b)0 N
Explanation : As the surface is frictionless.
From newton's 1st law of motion, since there is no external force acting on the object, it will remain in its original state of motion i.e. uniform velocity.Therefore, zero force is required to keep the object moving with constant velocity.
6 a) have same velocities at any instant
Explanation : When two objects of different masses fall freely near the surface of the Moon (or any celestial body), they experience the same acceleration due to gravity. This is because the acceleration due to gravity depends only on the mass of the celestial body and the distance from its center1. As a result, both objects will have the same velocities at any instant during their free fall.
7 b) is least on poles
Explanation : The distance from center to the surface of earth is more at equator, Since g=(GM)/r2, More the r less will be the acceleration due to gravity.
8 a) F/4
Explanation : The force of gravitational attraction between the two bodies of mass (
M) and (m) is F=GMm/r2.Now, If masses of both objects are halved without changing distance between them or M=M/2 and m=m/2
Now, F=GMm/4r2.
Thus, force becomes one-fourth as we reduce the masses to half without altering the distances.
9 c) will move along a straight line tangential to the circular path
Explanation : When the boy is whirling a stone tied with a string in a horizontal circular path, a centripetal force will act towards the center of the circular path.
In every moment of the circular path, the direction of motion (velocity) is directed along the tangent of the circular path. When the string breaks, then the centripetal force will vanish. According to Newton's law, the body will move along the tangential path, because it wants to continue its motion - due to dynamic inertia.
10 c) any two bodies having some mass
Explanation : Law of gravitation gives the gravitational force between any two bodies having some mass.