ANALYSIS OF RESPONSES CBT CLASS IX SCIENCE OCT 2023

Average- 4.64 / 10 points
Median- 4 / 10 points
Range-   0 -10 points
Total points distribution-

Scores	0	1	2	3	4	5	6	7	8	9	10
No. of Students	90	343	708	828	768	637	457	396	387	314	176

Frequently missed questions- (less than 50% students responded correctly)

Q2-A boy of mass 50 kg standing on ground exerts a force of 500 N on the ground. The force exerted by the ground on the boy will be –

Correct responses- 500N 2128 / 5104 (41.7%)

Explanation-

This is because the ground exerts an equal and opposite force on the boy.

Q4. A fielder pulls his hands backwards after catching the cricket ball. This enables the fielder to –

Correct responses-Reduce the force exerted by the ball 2520 / 5104 (49.4%)

Explanation-

By moving the hand backwards, the impulse applied by the ball on the hand decreases as the time period of slowing down the ball increases. Thus, the fielder experiences less force on his hands while catching the ball.

Q6. Two objects of different masses falling freely near the surface of moon would –

Correct responses-Have same velocities at any instant 2231 / 5104 (43.7%)

Explanation –

In a free fall, velocity depends only on the acceleration produced by gravity. The acceleration due to gravity is independent of the mass of the body. Hence, the same acceleration due to gravity of Moon is applied on both objects. So, they will have the same velocities at any instant irrespective of their masses. The two will not experience the same force as force is dependent on mass and mass of the body is different here.

Q7. Two particles are placed at some distance from each other. If, keeping the distance between them unchanged, the mass of each of the two particles is doubled, the value of gravitational force between them will become –
Correct responses- Four times 2204 / 5104(43.18%)

Explanation –

The gravitational force between two objects varies directly as their masses and inversely as the square of the distance between them. So, when the masses of both objects are doubled without changing the distance, the gravitational force between them would become four times of the original value.

Q8. The gravitational force of attraction between two objects is x. Keeping the masses of the objects unchanged, if the distance between the objects is halved, then the magnitude of gravitational force between them will become –
Correct responses- 4X **1399** / 5104 (27.4%)

Explanation –

The force of gravitational attraction is directly dependent upon the masses of both objects and inversely proportional to the square of the distance that separates their centres. Newton's conclusion about the magnitude of gravitational forces is summarized symbolically as

$F \propto m1.m2d2$

where, m1 and m2 are masses of the object and d is the distance of separation between them.

In this case, the distance between A and B is halved. So, the gravitational force will

become $F \propto m1.m2(d2)2, that is, F \propto 4m1.m2d2$

Hence, the magnitude of gravitational force between them will become 4F.

Q10. In the relation F = G × M × m/d2, the quantity G –

Correct responses- **Is of the same value irrespective of the place of observation.1360** / 5104 (26.64%)

Explanation –
The quantity G is universal constant of nature. It is applied to all the body present in universe It is constant of proportionality in Newton's universal law of gravitation. The accepted value of G is $6.67 \times 10^{-11} \ N \ m^2 \ kg^{-2}$.

Other responses-

Q1- The inertia of an object tends to cause an object-

Correct responses- **To resist a change in its state of motion 3,371** / 5,104 (66%)

Explanation –
Newton's first law of motion:

1. According to Newton's first law of motion, "A body continues to be in its state of rest or uniform motion along a given direction, until and unless an external force is applied on it."

2. This is also known as the law of inertia.

Inertia:

1. Inertia is the property of a body that by which it is unable to change its position of rest or uniform motion.
2. Thus, the inertia of a body tends to cause the object to resist any change in its state of motion.
3. It depends on the mass of the body.
4. The greater the mass of a body, the greater will be the inertia and the more difficult it will be to move the body.

Hence, the inertia of a body tends to cause the object <u>to resist any change in its state of motion.</u>

Q3-According to the third law of motion, action and reaction –

<u>**Correct responses**</u> - **Always act on different bodies in opposite directions 2,575 / 5,104 (50.5%)**

Explanation –

1. 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.
2. Thus, the action and reaction force work on two different bodies in opposite direction and has the same magnitude.

Q5. A water tanker filled up to two-thirds of its tank with water is running with a uniform speed. When the brakes are suddenly applied, the water in its tank would –

<u>**Correct responses-**</u> **Move forward 2,929 / 5,104 (57.4%)**

Explanation –
Applying brakes on the water tanks:

1. Newton's first law of motion states that a body undergoing motion would continue to move if no external force would be applied to it. Because the water throughout the tanker isn't a component of the tanker, whenever we apply the brakes, the water doesn't quite stop because there is no external force upon that.
2. Whenever a tanker seems to be half full with water, the water inside the tanker flows at a similar speed as that of the tanker.
3. If suddenly brakes are applied, the tank decreases its speed but water cannot decrease its speed immediately because of its inertia.
4. The tanker's velocity slows whenever the brake pedal is pressed, but no external force has been acting directly somewhat on the water. As an outcome, the tanker's velocity decreases but the velocity of the water within remains constant.

Therefore, whenever the brakes are applied, the water in the tanker will continue to move forward.

Q9. The value of g on the surface of the moon –

Correct responses -**Is less than that on the earth 2,979 / 5,104 (58.4%)**

Explanation –
The mass of the moon is 7.35×10^{22}kg. Thus, the value of g on moon is g=1.625 m/s^2.