Physics class 11 rotational motion notes pdf

• A solid body is a body with a perfectly definite and immutable shape. The distance between all pairs of particles of such a body does not change. • Mass centre For the particle system, the centre of the mass is defined as the point at which the whole mass of the system is expected to be concentrated, taking into account its translational movement. Should all external forces acting on the body/body system be used in the centre of the mass, the rest/movement status of the body/body system shall remain intact. • The centre of the mass of the bodywork or system is its balancing point. The centre of mass of the two-part system always lies on the line joining the two particles and is somewhere between the particles. • Movement of the centre of the mass The centre of the mass of the particle system moves as if the entire mass of the system is concentrated in the centre of the mass, and at this point all external forces have been used. The centre speed of the mass of the two-particle system, m1 and m2 at v1 and v2 is given, • If no external force attacks the body, then the centre of the mass will have constant dynamics. Its speed is constant and the acceleration is zero, i.e. MVcm = constant. • Vector product or cross product of two vectors • Torque is the torque of the force. The torque applied to particles is defined as the amount of the particle-force size and the perpendicular distance by the force of the force from the axis of rotation of the particle. • Angular momentum The angular momentum (or momentum moment) around the axis of rotation is a vector quantity equal to the amounts of momentum size and perpendicular distance of the action drive line from the axis of rotation and its direction is perpendicular to the plane containing the momentum and perpendicular distance. • The axis of rotation The rigid body is said to rotate if each point mass that forms it describes a circular path of a different radius but the same angular speed. Circular paths of all point masses have a common center. The line passing through this common centre is the axis of rotation. • The rigid bodywork is said to be in balance if, when the forces/torques are heard, the body remains in a resting or uniform motion position. For translational equilibrium, the vector sum of all forces applied to the body must be zero. In the case of rotational equilibrium, the vector sum of the torques of all forces applied to this body must be about reference point zero. For full equilibrium, both of these conditions must be met. • Pair two identical and opposite forces acting on the body, but have different lines of action, forming a pair. The net force due to the pair is zero, but they develop torque and produce rotational motion. • Moment of inertia The rotating inertia of the solid body is referred to as the moment of inertia. The moment of inertia of the body around the axis is defined as the sum of the products of the mass of the particles forming the body and the square of their respective perpendicular distance from the axis. It's given. • Radius of gyration The distance of the point in the body from the axis of rotation at which the entire mass of the body should be concentrated, its moment of inertia around the axis of rotation would be the same as that determined by the actual distribution of the body's mass, called the radius of the gyration. Taking into account that the entire mass of the body is concentrated at a distance K from the axis of rotation, then the moment of inertia I can express as I = MK2 • Sentence of parallel axes According to this sentence, the moment of inertia I of the body around any axis is equal to the moment of inertia around the parallel axis through the centre of matter , Icm, plus Ma2, where M is the mass of the body and V is perpendicular to the distance between the axes , i.e. I = Icm + Ma2 • Sentence of perpendicular axes According to this sentence, the moment of inertia I of the body around the perpendicular axis is equal to the sum of the moments of inertia of the body of about two axes at right angles to each other in the plane of the body and intersects at the point where the perpendicular axis passes, i.e. • Motion rolling The combination of rotational movement and translational movement of the solid is known as motion rolling. • Law on the maintenance of angular momentum According to the Law on the maintenance of angular momentum, if there is no external vain acting, the total angular momentum of the solid body or particle system is maintained. • IMPORTANT TABLES Class 11 Physics Notes Explain translational motionIn this type of movement, each body point will experience the same shift, and the distance between points also remains the same. (image will be uploaded soon) Now they believe that the rectangular brick is placed on the surface of the oblique edge of the rectangular triangle. Each point of rectangular bricks experience the same shift in the state that there are no lateral movements of this brick. An important fact is also that the distance between points (P1, P2) remains constant. Examples of translational movement include moving a car in a straight path, a bullet fired from a gun, etc. Just trying to understand the rotational movement with this example. Consider that the circular block happens down on the edge of a rectangular triangle. The rotational movement is completely different from the translational motion. These types of movements depend on the design of the objects. The circular body experiences a different movement than the rectangular body. (image will be uploaded soon) According to the figure, points P1, P2, P3, P4 have sizes and speeds in different directions. CBSE Class 11 Physics Notes Chapter 7 Particle Systems and Rotary MotionWhat do you mean by the center of matter? The point that holds the entire weight of the body is known as the center of matter. We can also indicate that all masses of the particle system appear to be concentrated. First, we learn about the dynamics of the movement of the particle system as a whole. Then we learn about the dynamics of individual particles of the system. Students need to focus on the dynamics of the unique point of the corresponding system. The Center of Matter explainedThiing unique point of movement is the same (identical) to the movement of a single particle. This monochal mass shall be equal to the sum of all discrete system particles and the resulting value of all forces applied to all system particles by the surrounding digits or by the dosing of the force area shall be applied directly to that particle. The point we explain is known as the center mass of the particle system. We can also name com as a short form. Many physicists use the concept of a center of matter to study the complicated movement of the particle system. Increase the part, that is, when two or more objects collide, or the object explodes into fragments. What do you mean, a solid body? For practical use, we deal with enlarged bodies. It can be deformable or firm (undeformable). The design of the enlarged body is possible as an infinitely large number of particles that have infinitely small separation between them. Why choose Vedantu for CBSE Class 11 Physics Notes? Vedantu has some other features that can draw the attention of students to take advantage of their study program. We believe in perfection. The content of physics notes are very useful for students. The qualities of Vedant that make his academic programs unique and beneficial to students are listed below. Content is prepared by highly qualified faculties. That's why students find it more comfortable and understandable when reading. Most importantly, physics notes are written with a very familiar language to make learning easier. The physics notes on Vedant consist of some important concepts, equations, facts and formulas according to CBSE Dreams. We design these notes in an accurate way so that all important illustrations can be useful to our students. Notes are useful for future exams because they contain important concepts that can create an opportunity to secure good grades. The center of the mass center weight system is the point that behaves because the entire mass of the system is centered on it and all external forces act on it. In the case of solid bodies, the centre of mass is independent of the state of the body, i.e. regardless of whether it is at rest or at the accelerated musculoculoculoculo-mass, it returns to the same area. Centre of mass of system n Particles If the system consists of n particles of mass m1, m2, m3 ,... mn with position vectors rl, r2, r3,... Rn. then place the vector of the centre of mass of the centre of mass of the two particle systems Select O as the origin of the coordinate axis. (ii) Position of the centre from m2 = (m1d) / m1 + m2 iii) If the vectors of the particle position of mass m1 and m2 r1 and r2spective, then iv) If in two particle systems the particles of mass m1 and m2 move at speeds v1 and v2, then the speed of the centre of mass v) If the particle accelerations are a1spective, then the acceleration of the centre of mass (vi) of the mass centre of the isolated system shall have a constant speed. (vii) This means that the isolated system will remain at rest if it initially rests or moves at the same speed if it is initially in motion. (viii) The position of the centre of matter depends on the shape, size and weight distribution of the body. ix) The center of the object's mass does not have to lie in the object. x In symmetrical formations with a homogeneous distribution mass, the centre of mass shall coincide with the geometric centre of the bodywork. xi The position of the centre of the object's mass changes the movement of the translator, but remains unchanged in rotational motion, the translational movement of the rigid body performs a pure translational movement if each part of the body undergoes the same displacement in the same direction within a given time interval. Rotational movement The rigid body performs a pure rotational movement when each part of the body moves in a circle and the centre of all circles lies on a straight line called the axis of rotation. Rigid body If the relative distance between the particles of the system does not change to the use of force, then it is called a rigtd body. The total movement of the rigid body consists of both translational movement and rotational movement. Moment of inertia The inertia of the rotational motion is called the moment of inertia. It is marked L. Moment of inertia is the property of the object on the basis of which it opposes any change in the state of rotation of the axis. The moment of inertia of the body around a given axis is equal to the sum of the products of the mass of its components and the square of their respective distances from the axis of rotation. Its unit is kg.m2 and its dimensional formula is [M2]. The moment of inertia of the body depends on the position of the axis of rotation of the axis of rotation shape and the size of the body layout of the axis of rotation. The physical significance of the moment of inertia is the same in rotational motion as the mass by linear movement. Radius of gyration The root of the median square distance of its components from the axis of rotation is called the radius of the gyration of the body. It is indicated by the K. Radius of gyration The confluence of body mass (M) and the square of its gyration radius (K) gives the same moment of inertia of the body around the rotational axis. Therefore, the moment of inertia I = MK2 ⇒ K = √1/M Parallel sentence Axes The moment of inertia of any object on any axes is equal to the sum of the moment of inertia about the parallel axis passing through the centre of the mass and the amount body and squares perpendicular to the distance between the two oss. Mathematically I = ICM + Mr2, where I am at the moment of inertia around any axis, IcM is the moment of inertia around the parallel axis through the center of the mass, M is the total mass of the object and r is the perpendicular distance between the axis. Perpendicular sentence of the axis The moment of inertia of any two-dimensional body about an axis perpendicular to its plane (Iz) shall be equal to the sum of the moments of inertia of the body of about two axes perpendicular to each other lying in its own plane and intersect with each other at a point, where it passes through a perpendicular axis. Mathematically Iz = Ix + Iy, where Ix and Iy are moments of inertia of the plane of the llama around the perpendicular axis X and Y which lie in the plane of the llama intersect each other. The sentence of the parallel ameals is applicable to any type of rigid body, whether two-dimensional or three-dimensional, whereas the sentence perpendicular applies only to the laminar type or two-dimensional bodies I. Moment of inertia of homogeneous fixed bodies for a thin circular ring ring for a thin cylinder for a rectangular cylinder for a thin spherical shell for rotary motion equations with a fixed ball (i) ω = ω 0 + αt ii) θ = ω0t + 1/2 αt2 iii) ω2 = ω02 + 2θ, where θ is the shift in rotational motion, ω0 is the initial speed, omega; is the final speed and is acceleration. Torque or force moment around the axis of rotation τ = r x F = rF sinθ n This is the vector quantity. If the nature of the force is to rotate the object clockwise, then the torque is called negative and if it rotates the object counterclockwise, then it is called positive. Its SI unit is a newton-meter and its size is [M2T-2]. With rotating torque movement, τ = Iα, where there is angular acceleration and 1 is the moment of inertia. Angular momentum The moment of linear momentum is called angular momentum. It is indicated by L. Angular momentum, L = I ω = mvr In vector form, L = I ω = r × mv Its unit is joule-second and its dimensional formula is [ML2T-1]. Torque, τ = In/dt Maintaining angular momentum If the external torque applied to the system is zero, then its angular momentum is maintained. If τext is 0, then L = I(ω) = constant ⇒ I1ω1== I2ω2 Angular pulse The total torque effect applied to the rotating body at a given time is called an angular pulse. The angular pulse shall be equal to the total change in the angular momentum of the system at a given time. Thus, Angular Pulse All CBSE Notes for Class 11 Physics Mathematics Notes Chemistry Notes Biology Notes To get the fastest exam alerts and government job alerts in India, join our Telegram channel. Channel.

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