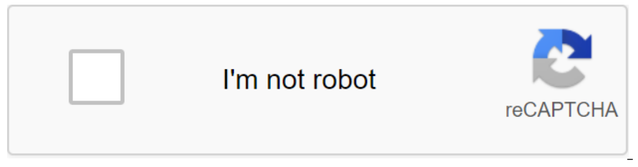

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Mass moment of inertia problems and solutions pdf

Particle inertia moment 1. A 100-gram ball connected to one end of a 30 cm long cord. Ignore the mass of the cord. Famous : Rotation axis on AB Mass ball (m) - 100 grams - 100/1000 - 0.1 kg Distance between ball and rotation axis (r) 30 cm and 0.3 m Required: Moment of inertia I) Solution : I m r2 (0.1 kg) (0.3 m)2 I (0.1 kg) (0.09 m2) I am 0.009 kg m2 2. A 100-gram ball, m1 and a 200-gram ball, m2, connected by a 60 cm long rod. The rotation axis is located in the center of the rod. What moment of inertia balls about the axis of rotation? Famous : Ball mass 1 (m1) 100 grams - 100/1000 - 0.1 kg Ball distance 1 and axis of rotation (r1) - 30 cm and 30/100 and 0.3 m Ball mass (m2) - 200 grams, 200/1000 - 0.2 kg Ball distance 2 and axis of rotation (r2) - 30 cm Jawab : I m1 r12 m2 r22 I (0.1 kg) (0.3 m)2 (0.2 kg) (0.3 m)2 I (0.1 kg) (0.09 m) 2) (0.2 kg) (0.09 m2) I - 0.009 kg m2 - 0.018 kg m2 I - 0.027 kg m2 Read: Gravity and gravitational field - problems and solutions 3. 200-gram ball, m1 and 100-gram ball, m2, connected by a rod 60 cm long. The rotation axis is located on the ball m2. What a moment of inertia balls. Ignore the mass of the rod. Famous : Ball mass 1 (m1) 200 grams 200/1000 and 0.2 kg Distance between ball 1 and axis of rotation (r1) /100 - 0.6 m Ball Mass 2 (m2) - 100 grams, 100/1000 - 0.1 kg between ball 2 and axis of rotation (r 0 m Wanted: Moment Inertia Balls Solution : I - m1 r12 - m2 r22 I (0.2 kg) (0.6 m)2 (0.2 kg)) (0)2 I (0.2 kg) (0.36 m2) 0 I and 0.072 kg m2 Read : Identify the result of two vectors using cosines equation 4. The weight of each ball is 100 grams connected by a cord. The length of the cord is 60 cm, the width of the cord - 30 cm. Ignore the mass of the cord. Famous : Ball mass - m1 - m2 - m3 - m4 - 100 grams - 100/1000 - 0.1 kg Distance between ball and axis of rotation (r1) - 30 cm, 30/100 - 0.3 m Distance between ball 2 and axis of rotation (r2) - 30 cm and 30 cm 30/100 - 0.3 m Distance between ball 3 and axis of rotation (r3) - 30 cm, 30 cm , 30/100 - 0.3 m Distance between ball 4 and axis of rotation (r4) - 30 cm . m1 r12 - m22 r22 - m3 r32 - m4 r42 I (0.1 kg) (0.3 m)2 (0.1 kg) (0.3 m)2 (0.1 kg) (0.3 m)2 (0.1 kg) (0.3 kg) (0.3 kg) (0.3 kg) kg) (0.3 kg) (0.3 kg) m)2 I (0.1 kg) (0.09 m2) - (0.1 kg) (0.09 m2) - 0.1 kg (0.09 m2) : Electricity - problems and solutions Moment inertia of a rigid object 5. A what The moment of inertia of the 2-kilogram homogeneous rod is 2 m long. Famous : Core mass (M) 2 kg Length rod (L) 2 m Required: Moment of inertia Solution : Formula of the moment of inertia, when the rotation axis is located in the center of a long homogeneous rod : I (1/12) M L2 I (1/12) (2 kg) (2 kg) (2 kg) (2 kg)) 2 m)2 I (1/12) (2 kg) (4 m 2) I (1/12) (8 kg m2) I - 8/12 kg m2 I - 2/3 kg m2 Read: Photovoltaic effect - problems and solutions 6. What is the moment of inertia of a 2-kilogram homogeneous rod 2 m long? The rotation axis is located at one end of the rod. Famous : Core mass (M) 2 kg Length hard rod (L) 2 m Required: Moment of inertia Solution : Formula of the moment of inertia when the rotation axis is located at one end of the rod : I (1/3) M L2 I (1/3) (1/3) (1/3)) (2 kg) (2 m)2 I (1/3) (2 kg) (4 m2) I (1/3) (8 kg m2) I 8/3 kg m2 Read: Adding vectors using components - problems and solutions 7. The 10-kilogram solid cylinder with a range of 0.1 m. The rotation axis is located in the center of the solid cylinder, shown in the picture below. What is the moment of cylinder inertia? Famous : Solid cylinder mass (M) - 10 kg Cylinder radius (L) 0.1 m Wanted: Moment of inertia Required: Moment of inertia Solution : Formula of inertia of the moment, when the rotation axis is located in the center of the cylinder: I (1/2) M R2 I (1/2)2) (10 kg)2 I (1/2) (10 kg) (0.01 m2) I q (1/2) (0.1 kg m2) I 0.05 kg m2 8 8. The 20-kilogram homogeneous sphere, 0.1 m long, is shown in the image below. Famous : Sphere mass (M) 20 kg Sphere radius (L) 0.1 m Required: moment of inertia Solution : Formula of the moment of inertia, when the rotation axis is located in the center of the sphere : I q (2/5) M R2 I (2/5) (20 kg) (0.0.) 1 m)) 2 I (2/5) (20 kg) (0.01 m2) I (2/5) (0.2 kg m2) I - 0.4/5 kg m2 I - 0.08 kg m2 Read: Dimensional analysis - problems and solutions 9. A rectangular thin plate weighing 2 kg in length of 0.5 m and width of 0.2 m. The axis of rotation, located in the center of the rectangular plate, is shown in the picture below. What is the moment of rectangular inertia? Famous : The mass of the rectangular board (M) 2 kg Board length (a) 0.5 m Board width (b) 0.2 m Required : Moment of inertia Solution : Formula of the moment of inertia, when the rotation axis is located in the center of the boards : I q (1/12) M (a2 q b2) I Issue (1/1 (0.52 0.22) I (2/12) (0.25 and 0.04) I (1/6) (0.29) I 0.29/6 kg m2 1. The two balls are connected by a rod, as shown in the picture below. Ignore the mass of the rod. The mass of the P ball is 600 grams, and the weight of the ball - 400 grams. What is the moment of system inertia about AB? Famous : AB Rotation Axis. mp - 600 grams - 0.6 kg, mq - 400 grams, 0.4 kg m/s - 20 cm, 0.2 m, 50 cm and 0.5 m Required: Moment of system solution inertia: I q mp rp2 - mq rq2 I (0.6 kg) (0.2 m)2 (0.4 kg) (0.5 m)2 I (0.6 m kg)) (0.04 m2) - (0.4 kg) (0.25 m2) I - 0.024 kg m2 , 0.1 kg m2 I - 0.124 kg m2 Read also: Direction of magnetic induction - problems and solutions 2. The AB genus rotates about point A, the moment of inertia of the rod is 8 kg m2. If it rotates about point O (AO and OB), then what is the moment of inertia of the rod. Famous : Mass rod AB (m) 2 kg If rotates about point A so that the radius of rotation (r) - the length of AB and r, then the moment of inertia (I) 8 kg m2 Wanted: If rotates about point O so that the radius of rotation (r) - the length of the AO and the length of OB 1/2 r, then what is the moment of inertia rod. Solution : I - m r2 8 kg m2 (2 kg) r2 8 m2 (2) r2 r2 - 8 m2 / 2 r2 - 4 m2 p 2 m. If it rotates about point O so 1/2 r , 1 meter, then the moment of inertia : I q m r2 (2 kg)(1 m)2 (2 kg) (1 m2) - 2 kg m2 Read: Newton's first law of movement - problems and solutions 3. Two balls connected by the rod, as shown in the picture below. Ignore the mass of the rod. What is the moment of inertia of the system. Famous : Mass ball A (mA) - 200 grams - 0.2 kg Ball Mass B (mB) - 400 grams and 0.4 kg Distance between ball A and axis of rotation (rA) - 0 Distance between ball B and rotation axis (rB) 25 cm and 0.25 m Required : Moment of inertia system decision : Moment of inertia Ball A : IA (mA) (rA2) Ball Inertia Moment B : IB (mB) (rB2) 2 Moment of system inertia : I - IA - IB 0 - 0.025 - 0.025 kg m2 - 25 x 10-3 kg m2 Read also: Huck Law - Problems and Solutions 4. Four particles with different mass, shown in the picture below. Determine the moment of inertia of the system on the horizontal line P. The Axis of Rotation solution is the horizontal P line. Famous : Particle Mass A (mA) - m Particle Mass B (mB) - 2m Particle Mass C (mC) - 3m Pass Particle D (mD) - 4m Distance between Particle A and Rotation Axis (rA) - b Distance between particle B and axis of rotation (rB) - b Distance between particle C and rotation axis (rC) - 2b Distance between particle D and rotation axis (rD) 2b Wanted : Moment of inertia of the system on the horizontal line P Solution : I and mA rA2 - m B rB2 - mC rC2 - mD rD2 I (m) (b)2 (2m) (b)2 (b)2 (3m) (2b)2 (4m) (2b)) 2 I - mb2 - 2 mb2 (3m) (4b2) - (4m) (4b2) I - 2 mb2 - 12 mb2 - 16 mb2 I - 31 MB2 Read : Optical devices - problems and solutions 5. Four particles connected by a rod. Ignore the mass of the rod. Determine the moment of inertia around the axis of rotation through the particles M1 and m2, as shown in the picture below. Known particle mass 1 (m1) - 1/4 kg Particle mass 2 (m2) and 1/2 kg Particle Mass 3 (m3) and 1/4 kg Mass Particle 4 (m4) - 1/4 kg Distance between particle 1 and axis of rotation (r1) - 0 Distance between particle 2 and rotation axis (r2) - 0 Distance between particle 3 and rotation axis (r3) 1/10 m Distance between particle 4 and axis of rotation (r4) - 10 cm . I (1/4) (0)2 (1/2) (0)2 (1/4) (1/10)2 (1/4) (1/10)2 I 4) (1/100) - (1/100) I - 1/4/ 1/100) I - 1/400 and 1/400 I - 2/400 kg.m2 Moment of inertia (symbol I, SI unit kg'm2) rotating object is a measure of Facebook that angular acceleration will be based on torque, and can therefore be considered as the rotational equivalent of mass. It is defined as $ cinth zhryu (r) r'2 dV $ For a toxic mass, it equals the distance from the center of rotation to a square once the mass of the object, or $I and mr'2 $ Moment of inertia is also equal to the angular momentum divided by angular speed, or $I. Determine the moment of inertia for each of the following forms. The rotation axis is the same as the axis of symmetry in all but two cases. Use M for the mass of each object. ring, hoop, cylindrical shell, thin tubular annul, hollow cylinder, thick tubular disk, solid cylindrical spherical shell of the hollow sphere of the solid sphere of the rod, rectangular plate (perpendicular bisector) rod, rectangular plate (axis along the edge) rectangular plate, solid box (axis perpendicular) mass moment of inertia problems and solutions pdf