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# Contoh soal dan pembahasan dinamika rotasi kelas xi pdf

Completion of the physical high school problem and motion -a Dynamics rotation is a branch of mechanics that studies involving rotary motorcycle with mass, strength and other factors that influence rotary motorcycle factor. An object is rotated if it is part of the objects around the movement shaft or rotation axis is located on one side of the object. Here you discuss dynamic rotation and troubleshooting class 11 as educational material for my friends. 1. A mass particle 0.1 grams of moves around the Y axis with a radius of 4 cm. The object is rotating with an angular acceleration 1 rad.s-2. Determine great: a. moment of inertia; B. time of force; C. Corner speed of the second-a-, stationary objects; . The linear speed to the second-a-, stationary objects; Of course! Physical response Pak dimpun a. Inertia moment of the particle Begin {align} * i & = sigma mr ^ 2 i & = 0.1 times (4) ^ 2 i & = 1.6 text {gram.cm} ^ {2} I & = 1.6 Times 10 ^ {- 7} text {kg m} ^ {2} end {align} * b. Moments Styles: Begin {* Align} Tau & = I. Tau and Alfa = 1.6 Times 10 ^ {- 7} (1) Tau & = 1.6 Times 10 ^ {} -7 nm end {* align} c. When the angular speed of the second beegin {align} * omega _ {t} & = omega _ {or} + alpha t _ omega _ {t} & = 0 + (1) (2) omega _ {t} & = 2 text {} rad.s ^ {- 1} end {* align} d. Linear speed according to 2 Begin {align} * a & = alpha .r a & = (1) 04:10 ^ {- 2} a & = 0.04ms ^ {- 2} v = & omega v & = (2) (0.04) v = & 0,08ms ^ {- 1} end {align *} 2. Dua small objects with mass 0.2gram fruit e 0.1gram are in the coordinated Axis XE axis field. The first object is coordinated (4.3), the object is coordinated (-2, -2), the XE axis Y axis without a unit cm. Determine the moment of inertia of the large system two objects if: a. Rotate the X axis; B. Rotate the Y axis; Physical response Pak dimpun a. The moment of inertia around the axis X Begin {Align} * I & = M_1R_1 ^ {2} + M_2R_2 ^ {2} I & = (0.2) (3) ^ {2} + (0 , 1) (2) ^ {2} i & = 2.2 text {} gram.cm ^ {2} i & = 2.2.10 ^ {- 7} text {kg m} ^ {2} END {align *} B. The moment of inertia around the axis y is Begin {align} * i & = m_1r_1 ^ {2} + m_2r_2 ^ {2} i & = (0.2) (4 ) ^ {2} + (0.1) (2) ^ {2} i & = 3.6gram.cm ^ {2} i & = 3.6.10 ^ {-} 7 kg m ^ {2 } END {ALIGN} * 3. A solid cylindrical mass 400 grams fingers -Jari 2 cm are at a point A at a height of 80 cm rolling without slipping on an inclined top Rough AB without initial speed. The angle of inclination 37 Â °. Determine great: a. acceleration cylinder when it reached the bottom of the slope (point b); B. When the speed of the cylinder along the inclined plane; C. When the friction force along the slope; . the friction coefficient of the slope and the cylinder; And. moment when force along the inclined plane; Of course! Physical response Pak dimpun a. acceleration cylinder when it reached the bottom of the slope (point b); Look at the picture; If the moment of inertia you write i = kmr2 then: Analysis of the motorcycle rotation: begin {align} * tau & = i alpha fr \ _ ^ ^ ^ km} F & = KMA .... (1) End {Align *} Translation Analysis: Begin {align} * and w sin theta f = ma & f = mg si-mma ... . (2) End {align *} Replacement Two equations: Begin {align *} f & = mg si-theta -ma .... (2) & f = kma .... (1) text {-} hline g & sin theta -a = ka & a = frac {g left} {k + 1} & a = frac {10 (0.6 )} {frac {1} {2}} +1 a & = 4 ms ^ {- 2} end {align *} speed when the slope down; begin {align *} v_ {b} ^ {2} & = v_ {a} ^ {2} + 2AS v_ {b} ^ {2} & = 0 + 2 bis (frac {h} { sin theta}) v_ {b} ^ {2} & = 2 (4) frac {0.8} {0.6} v_ {b} & = frac {4} {3} sqrt {6}: ms ^ {- 1} end {align *} c. when the friction force along the begin {align} * f & f = kma {2} (0) {2} (0.4) (4) f & = 0.8n end {align *} d, the coefficient of slope friction and the cylinder; begin {align} * f = & mg mg theta 0.8 and = mu (0.4) (10) (0.8) mu & = 0, 25n end { * Align} e. moment when force along the inclined plane; begin {align} * tau & = i alpha \ tau & = ^ kmr 2. frac {a} {r} \\\\a tau and tau = kmar & = frac {1} { 2} (0.4) (4) (0.02) Tau & = Fine 0.016nm {* Align} 4. Two objects tied with strings that are considered to be mutless then the rope hooked to a pulley as shown. The first object of the mass of 300 grams, the great mass of the second body 500 grams and 400 grams of mass of the pulley. Determine great: a. Acceleration acceleration object; B. tension ropes; Physical response Pak also a. Acceleration experienced by objects: begin {* align} a & = frac {mg} {sigma m + frac {1} {2}} m_k & a = frac {(0.5-0 , 3) 10} {0.5 + 0.3 + frac {1} {2} (0.4)} a & = 2 ms ^ {- 2} end {align} * b. tension ropes; Because M1 wb) tb Ã ¢ â,¬ "wb = mb a tb Ã ¢ â,¬" mb g = mb a tb = mb g + mb a. .. (2) Review pulley â Â â Ã¯ " = IÂ® Â ± Ã¯ "Ã ¢ â,¬" i "b = ik i Â ± (i" = TR) (ta Ã ¢ â,¬ "TB) r = (Â½ r2) (a / r) (Ta Ã ¢ â,¬ "TB) = (Â½ mk) (a) ... (3) Press replacement (1) and (2) to print (3) (but g Ã ¢ â,¬" but a ) Ã ¢ â,¬ "(MB G + MB a) = Â½ MB a but g Ã ¢ â,¬" MB g = Â½ MK A + but Â ± + but one (but Ã ¢ â,¬ "MB) = G (Â½ MK + MA + MB) an equation above in q aleche a book is called in a rapid way for this problem with but> MB. By entering the known value then (but Ã ¢ â,¬ "MB) g = (Â½ mk + but + mb) a (4 Ã ¢ â,¬" 3) 10 = (Â½ + 4 + 3) 10 = 8 a 1.250 m / s2 = a becomes the acceleration of objects a (even the same as the acceleration of the system) of 1.250 m / s2 questions number 5 three identical particles related with mass at the end of a triangle elbow with the legs of auctions of Inaccuracy connection. Both sides have a long time. The moment of inertia This difficult object for the rotation axis based on its inclined side is ... A. Â¼ MA2 B. Â½ MA2 C. A response â,¬ MA2 D. MA2 E. 3/2 MA2 Key: Ã ¢ â,¬ BAA â,¬ Questions Number 6 See the following image! Determine the moment of inertia of the particulate system above, if the system started with a tree in the center of coordinates A. 4M 6M BCD 11m 13m E. 17m Response key: Ã ¢ â,¬ OEEA â,¬ Problem number 7 AB auction with a mass of 2 kg rotated through the point A turns out that the moment is 8 KGM2. When playing through the central point of O (or = OB), the moment of the Innerity becomes ... KGM2 A. 2 B. 4 C. 8 D. 12 E. 16 The response key: Ã ¢ â,¬ Å "AÃ ¢ â,¬ Discussion number 7: based on questions can be known m = 2 kg i = 8 kgm2 (axis in a) so that the moment of inertia for the stem of a tree on the edge i = 1/3 ml2 8 = (1/3) (2) L2 12 = L2 2Â,â¡3 m = l Using the parallel theorem axis, it is possible to determine the moment of inertia when the tree in the center (D = 1 / 2L) I = IPM + MD2 8 = IPP + (2) (AS3) 2 8 = IPM + (6) PM = 2 KGM2 Question Number 8 Note The following image! A homogeneous circular disc with fingers with mass m rotation with a tree through the center of the disc and perpendicular to the field has a moment of inertia I0 = Â½ MR2. A hole is cut into the disc as shown in the diagram. The moment of inertia produced by objects on the axis as an image is .... A. (15/32) MR2 B. (13/32) MR2 C. (3/8) MR2 D. 9/32 MR2 E . (15/16) MR2 Key Answer: Ã ¢ â,¬ OEBA â,¬ Discussion Number 8: To determine the moment of pierced Objacous inertia, it can be done to reduce the moment of Inertics inertia with a moment of inertia in the hole according to l 'Axis axis (the disc is a copy cylinder). Mathematically can be written i = ib Ã ¢ â,¬ "The determines the moment of inertia of the moment of inertia cylinder inertia with a tree through the center of mass and perpendicular field is ib = Â½ mr2 determines the moment of hole inertia hole inertia Inertia equal to the moment of inertia cut parts, mass hole can be determined by the way in which the inertia moment of the hole when the tree through the center of the body and perpendicular to the PI = Â½ (Â¼) (Â¼) 2 IP = 1 / 32 mr2 Note that the spinning hole with the shaft is on the edge, so that the time the inside can be referred to the theorem axis is parallel to the following = IP + MLD2 i = 1/32 MR2 + (Â¼ m) (Â,Â¼m) 2 il = 1/32 mr2 + 1/16 mr2 = 3/32 mr2 so that the point of inertia of the object is itot = ib - the itot = Â½ mr2 - 3/32 mr2 itot = 13/32 mr2 questions number 9 pay attention to the following table! The biggest angular moment is shown by objects ... A. 1 B. 2 C. 3 D. 4 E. 5 The key Ris Post: Ã ¢ â,¬ Oeda â,¬ Problem number 10 rotates a dancer on the ground floor whose clutch is ignored. In the position of the hands and feet, do not spread the moment of inertia I and the speed with the 2.4 rad / s queue. Then both hands and a leg unfold up to the moment of the 1,6 I Intersion. So, for the 8 Sekon dancers conducted the largest number of revolutions up to an â,¬ |. A. 1.5 times B. 3 times C. 6 times D. 12 times E. 24 times the answer button: Ã ¢ â,¬ OECA â,¬ Discussion number 10: Based on the problem can be known when your hands and feet I'm 0 don't explain = I Ã¯ â € 0 = 2.4i â,¬ rad / s when your feet are stretched i = 1.6en = 8 seconds ...? To discover the speed of the corner when the hands and legs are spread to use the eternity law of the angular momentum L0 = l i0 Ã¯ â € 0 = i I â € ™. 2.4i â,¬ = 1.6i Ã¯ â € ã Ã¯ â € = 1.5i â,¬ rad / s (1 rad / s = (1 / 2i â,¬) put / s) that Â € = (1.5i â,¬ / 2i â,¬) Put / s Ã¯ â € = 0.75 put / sn = I â €. t n = 0.75. 8 n = 6 times so for the 8 Sekon the dancer turns 6 times when his hands and legs are tense. As for the number 11 a dancer standing on the slippery ice floor and spinning instead of her as in the initial photo of the swivel dancer crossing both hands on the chest (figure a). Then the dancer returned back as she extends her hands (figure b). The instruction in the table below is correctly related to the two cases mentioned above is .... Response key: Ã ¢ â,¬ OEY â,¬ problems number 12 At the time of a rotation 120 rpm 120 (Figure 1) , the disk placed on the A (Figure 2) so that the two plates spin with the same tree. A Nuised Massa A = 100 grams and the mass of the disk b = 300 grams, while the fingers aligned a = 50 cm and the plach finger b = 30 centimeters. if the moments of disc inertia are Â½ Â½ Then the great speed in the curve of the two dishes at the moment spinning together is .... A. 0.67 Ã¯ â,¬ RAD.S-1 B. 0.83 Ã¯ â,¬ RAD.S-1 C. 1.92 Ã¯ â,¬ RAD. S-1 d. 4.28 Ã¯ â,¬ Rad.S-1 E. 5.71 Ã¯ â,¬ RAD.S-1 Response key: Ã ¢ â,¬ OECA â,¬ Problem Discussion number 12: convert the unit from Pleple Place at i a = 120 rpm (rotation per minute) Ã¯ â € ° a = 120. 2i â,¬ / 60 rad / s Ã¯ â € ° a = 4i â,¬ rad / s eternity law of angles motion of a corner = late. Ã â € ° a = (ha + ib). Ã Â½ but. RA2. Ã â € ° a = (Â½ ma. RA2 + Ã,½emb. RA2). Ã Ã Â½. 0.1. (Â½) 2. 4i â,¬ = (Â½. 0.1. (Â½) 2 + Â½. 0.1 (0.3) 2). Ã â € ° (all tribes are divided from Â½) 0.1 II = (0.025 + 0.027) Ã¯ â € 0.1 Ã¯ â,¬ = (0.052) Ã¯ â € 1.92 Ã ¯ â,¬ = i â € 1 question number 13 spheres mass 3.5 kg laminated without piston along the inclination field with a slope of 300. If the acceleration of gravity is 10 m / s2, the friction force between the field the ball is ... A. 1 n 2 n BCD 3 n 4 n E. 5 Answer n Key: Ã ¢ â,¬ OEY â,¬ The discussion of demand number 13: the question can be illustrated as follows The rolling object has two movements that is translation movement (rectilinear motorcycle) and rotation movement. Based on the image above, the pair of owner of a cylinder (I = 2/5 MR2) obtained from the friction force (F), while the axis x component of the weight (WX), not because it works directly in the center The mass matter (like a tree) and therefore the Equation Law II Newton for rotation motion can be written. Ãž £ i "= iÂ® Â ± i" f = iÂ® Â ± f. R = (2/5 MR2) (a / r) f = 2/5 mA. 5F / 2M = A .. (1) For translation bikes £ f = m. a wx Ã ¢ â,¬ "f = m. a (wx Ã ¢ â,¬" f) / m = a ... (2) Based on the press release (2) a (1), can be written in a way The friction for the field platform of 5 N Precise moves, pays attention to the previous equation equation can be called an â,¬ Å "Rumus Fasta â,¬ to determine the friction style on the objects laminated with the value of Ã ¢ â,¬ å "kÃ ¢ â,¬ is the constant moment of inertia inertia objects rolling questions number 14 a homogeneous cylinder with a finger of 20 cm and mass 2 kg what is in the upper part of the tilted field cylinders slide along the field , as shown. The speed of objects when it comes to the bottom of the inclined field Ã¨ Ã ¢ â,¬ .. A. 2Ã,â¡4 m / s B. 2Ã,Â¡5 m / s C. AS30 M / S D. AS40 M / s E. 30 m / s Response keys :. Ã ¢ â,¬ Å "AÃ ¢ â,¬ problems number 15 A clear sphere is on a plane, then the ball is driven by F. comparison of the acceleration experimented by the ball when it slips ball and when the ball roll is ... A. 3/2 B. 2/3 C. 7/5 5/7 de 8/5 Response key: Ã ¢ â,¬ OECA â,¬ problem Discussion number 15: Based on the problem can be known For the throne style = objects f = m mass (precipitate) the ball advances (translation) when the ball advances meaning the ball moves only translation without rotation because there is no friction between the ball with the floor (slippery floor) , then applying the Law II Newton then obtained Â® Â £ f = m. an f = m. A1 = f / m ... (1) The ball rollers (translation and rotation) when the ball rolls, there are two movements, that is translation and motorcycle rotation, this rotation motion occurs because there is A friction style (F) between the ball with the floor (the floor is not slippery). Therefore, applying the Newton II law for both movements, then translation motion I £ f = m. a f - f = m. A ... (a) motion i â â Ã¯ rotazione "= i. Ãž ± i" f = i. Ãž Â ± (i "= f. r) fr = 2/5 mr2 (a / r) f = 2/5 ma ... (b) replacement of the press (b) ad (a) f - 2/5 MA = MA F = MA + 2/5 m mA F = 7/5 MA A2 = 5F / 7M Then the comparison of the acceleration of the two movements is the right move: note the equation f = but + 2/5 But if 2/5 is a constant (K) from the minute laminated inertial objects, the equation above can be written f = but + kma f = (1 + k) an equation above, can be indicated as a "rumus fasta â,¬ for objects rolling on the flat floor when pushed with the style of f with k is a From the minute inertia objects. The number 16 a Plattery Bol i question (2/5) MR2 2 kg masses laminated in a flat field as shown by the image on the on the At the time of linear ball v = 10 m Â · SÃ ¢ â,¬ "1, then the total kinetic energy of the ball is .... A. 28 J B. 70 J C. 140 J D. 280 J e . 1400 J Response key: Ã ¢ â,¬ OECA â,¬ The discussion of the number 16: spheres rolling have translation and motorcycle of rotation, so the total kinetic energy is the quantity of kinetic energy of translation and Kinetic Energy Rotation. EKTOT = EKT + ERR EKTOT = Â½ MV2 + Â½ II â € 2 ECTOT = Â½ MV2 + Â½ (2/5) MR2 (V / R) 2 ECTOT = Â½ MV2 MV2 + 1/5 = 7 / 10 ectot mv2 ectot = 7/10. 2. (10) 2 extot = 140 j then the total energy energy is 140 j: clock back the equation: ectot = Â½ mv2 + Â½ (2/5) mr2 (V / r) 2 2/5 is a constant Ã ¢ â,¬ eek â,¬ the moment of inertia of the object so that ectot = Â½ mv2 + Â½ (k) mv2 ectot = (1 + k) Â½ mv2 equation above, can be defined as the fast formula for total energy rolling objects flat fields. As for the questions wise number 1 a quad frame Rato made of four thin stems each of which has a long and mass m. Determine the moment of inertia of the frame if it is rotated with the shaft axis as shown below! Discussion number 1: (a) pay attention to the following image The total time of wake at the top, mathematically can be written ITOT = 2IT + 2IQ Determine IP IP = MR2 IP = M (Ã,Â½L) 2 IP = Â¼ ML2 Determines IQ IQ = 1/12 ml2 so itt = 2 (Â¼ ml2) + 2 (1/12 ml2) itot = Â½ ml2 + 1/6 ml2 itot = 4/6 = 2/3 ml2 itot ml2 (b), pay attention to Image of the moment of inertia with diagonal shaft (figure a) mathematically written ITOT = 4 IQ specifies IQ Take a part as shown (b), using a solidarity principle to the limit requirement 0 to L Then. So itot = 4 (1/6) ml2 itot = 2/3 ml2 (c) pay attention to the following image! The moment of inertia wakes up with a tree as in the image (a) can be determined by a perpendicular axis theorem as seen in the image (b) ie iz = ix + IY iz = 2/3 2/3 + Ml2 ml2 iz = 4/3 ml2 The most complete discussion of how to determine the moment of inertia objects can be seen in the connection here questions number 2 two objects each with mass m1 = 4 kg and m2 = 4 kg connected with a pulley that 4 kg masses as shown in the image below. If the surface of the AB is slippery, specify the acceleration of M1 and M2 objects! Discussion Number 2: Because the AB is slippery, there is no friction style between the AB and M1 field and both objects (and pulley) Move together so the acceleration of the two objects is just as big (Even the same linear acceleration pulley). We can draw styles on the system as follows using the Law II Newton we can review the movements of each object object 1 in motion, in mode T1> W1Y I £ f = M1 to T1 - W1Y = M1 to T1 = M1 A + W1Y. .. (1) Object 2 objects move downwards W2> T2 I Â £ f = m2 to w2 Ã ¢ â,¬ "t2 = m2 to t2 = w2 Ã ¢ â,¬" m2 ... (2) Pulley Rotating pulley clockwise (T2> T1) II "= II Â ± i" 2 - I "1 = I Â ± (I" = F. R) (T2 - T1) R = Â½ MR2 (a / R) (pulley is considered a protective cylinder) t2 - t1 = Â½ mk a ... (3) print replacement (1) and (2) to print (3) t2 - t1 = Â½ mk a (w2 Ã ¢ â,¬ "m2 a) - (m1 a + w1y) = Â½ mk a w2 Ã ¢ â,¬" m2 a - m1 a - w1y = Â½ mk a w2 - w1y = Â½ mk a + m2 a + m1 a m2 g - m1 g sin 300 = (Â½ mk + m2 + m1) a (m2 -. m1 sin 300) g = (Â½ mk + m2 + m1) a (4 Ã ¢ â,¬ "4 (Â½)) 10 = (Â½ 4 + 4 + 4) at 20 = (10) at 20 m / s2 = a becomes the acceleration of the system is 20 m / s2 adjective: rear clock m2 g - g m1 sin 300 = (Â½ Mk + m2 + m1) a, can be written previous equation can be called with Ã ¢ â,¬ å "rumus fasta â,¬ to determine the acceleration of the system in the inclination field as in matter. Beams demand number or 3 two m1 and m2 are connected to each other with a rope that transmits two pulleys that are identical at the time of inertia the as in the following image. Determine the acceleration of the DISCUSSION OBJECTS Number 3: Accelerate the two objects with system acceleration. The styles that work on the system can be described as how We can use the Newton II law to analyze each object. Review the object 1 Because the object moves, then T1> W1 I Â £ f = m1 a t1 - w1 = m1 a t1 = m1 a + w1 ,, (1) Review objects 2 Because the object yes Move down, then T3 m1 and k is the moment of INERZ I Questions Pulley number 4 Note The following image! The wheel in the image has a mass of 2.0 kg and a radius of 0.20 m, and the initial angular speed of 50 rad / s (about 500 rpm). A wheel in a copy (an axis) with pieces B which has a mass of 4.0 kg, fingers 0.10 m, and the angular initial speed of 200 rad / s (high image). Determine the speed of the final Ã¯ angle together â €th after both are pushed so that it comes out contact (image below) in. Is eternal kinetic energy during this process? Discussion number 4: To find out if the eternal system of the kinetic system during the process takes place, we must know the initial kinetic energy and the final kinetic energy of the system (the system is unique in rotation) (the wheel is a cylinder at the time of inertia i = Â½ mr2) he = Â½ but ra2 he = ½ 2 (0.2) 2 he = 0.04 kgm2 ib = Â½ mb rb2 ib = Â½ 4 (0.1) 2 ib = 0.02 kgm2 initial state EK0 = EKA + EKB EK0 = Â½ He Ã¯ â € ™ A2 + Â½ Â½ II B2 EK0 = Â½ (0.04) (50) 2 + Â½ (0.02) (200) 2 EK0 = 50 + 400 EK0 = 450 J The situation Final that must before determining the speed of the system angle after two wheels join with the law of the eternity of the angular momentum L0 = l he â € œI i Ã¯ â € ™ â € ™ (he + ib) ¯ Â € (0.04) (50) + (0.02) (200) = (0, 04 + 0.02) Ã¯ â € 2 + 4 = 0.06 Ã¯ â € 6 = 0.06 Ã¯ Â € 100 rad / s = I â € œThe kinetic energy EK = Â½ Itot Ã¯ â € ™ 2 oak = Â½ (0.06) (100) 2 oak = 300 J Based on the results you can see that energy kinetics during the Process is eternal (initially 450J A 300 J) This is analogous to collision is not resistant to all pads a legal material of the quantity of motorcycles. Question Number 5 A copy cylinder that was originally in silence Rolled from the top of a sloping field. When in the base of the inclined field of 4 m / s speed. Determine the height of the slope field! Problem Discussion number 5: Based on the application it can be known V0 = 0 (initially silent) V = 4 mr2 m / si = Â½ mr2 (moment of cylinders inertia inertia) because the initial object is silence, then it has no energy Kinetics and when total rolling of kinetic energy is a kinetic translation energy coupled with rotational kinetic energy. Based on the Energy Law, it can be written by EM1 EM2 = PE = EKT + EXR MGH = Â½ MV2 + Â½ II â € 2 MGH = Â½ MV2 + Â½ (1/2) MR2 (V / R) 2 MGH = Â½ mv2 + Â¼ mv2 gh = Â¾ v2 10 h = 42 Â¾ 10 h = 12 h = 1.2 m so the initial height of the object is 1.2 mm

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