Libro dinamica bedford

MECONIC PAR INGENIONIA DYNAMICS (SOLUCIONARIO) Kinta edici'n Bedford 1 Fowler----PIARSON Prentice Hall ®Problem 12.1 Value π is 3.1415962654. . . . . If Solution:C is the circumference of a circle and r is its radius, determine r/C to four significant digits. C q 2'r ⇒ r y 1 y 0.159154943. C 2 To four significant figures we have r 0.1592 CProblem 12.2 Base natural logariths e - Solution: value e: e 2.718281822.7182828 . . (a) Up to five significant e q 2.7183 (a) Express e figures up to five significant figures. (b) e2-5 significant indicators - e2 - 7.3891 (b) Determine e2 to five significant figures. (c) Using a value from part a) we find e2 and 7.3892, which (c) uses the e value received partially (a) to deter - not correct in the fifth digit. my value e2 to five significant figures. Part (c) demonstrates the danger of using rounded-offvalues in calculations. Problem 12.3 The machinist drills a round hole in the solution: a panel with a nominal radius of r 5 mm. The actual radius of the hole is in the range of r 5 ± 0.01 mm. (a) Where (a) the radius is in the range of r1 and 4.99 mm to r2 and 5.01 mm. Sensitivity of significant figures can you express the radius? the figures are not equal at the level of three significant figures, but b) To what number of significant figures can you express that they are equal if they are rounded to two significant digits.the area of the hole? Two: R 5.0 mm 5 mm (b) The opening area ranges from A1 and π r12 to 78,226 m2 to A2 and π r22 and 78,854 m2. These numbers are equal only if rounded to one significant figure: One: 80 mm2Problem 12.4 Opening in a football goal is 25 feet wide and 8 feet high, so its area is 24 feet × 8 feet and 192 feet2. What is its area in m2 to three significant figures? Solution: 1m 2A 192 ft2 3.281 ft and 17.8 m2A 17.8 m2c 2008 Pearson Education South Asia Pte Ltd. All rights reserved. This publication is copyrighted and permission must be obtained from the publisher up to 1to any prohibited reproduction, storage in the search system, or transmission in any form or by any means, electronic, mechanical, photocopying, recording or similar manner. The 12.5 Burj Dubai challenge, scheduled for south-east 2008, will be the tallest building in the world with a height of 705 m. The area of its terrestrial footprint will be 8000 m2. We convert its height and trace area into ordinary U.S. units to three significant digits. Solution: 705m 3,281ft - 2.31 × 103ft 1m - 8,000 m2 3,218ft 2,218m, 8.61 × 104ft 2.31 × 103ft, A 8.61 × 104 ft2Problem 12.6 Suppose you just purchased a solution: Convert the metric size n to inches, and calculate the Ferrari F355 coupe, and you want to know if you can use your SAE set (US Ordinary Units) percentage difference between metric nut sizes SAEwrenches work on it. Results: w 1/4 in, 1/2 in, 3/4 in, and 1 in, and the car has nutswith sizes n 5 mm, 10 mm, 15 mm, 20 mm, 5 mm 1 inch 0.19685.. In, 0.19685 - 0.25 and 25 mm. Definition of a wrench to match if w no more than 100than 2% more than which of your wrenches can you 25.4 mm 0.19685use? 27.0% n 10 mm 1 inch 0.3937. V, 0.3937 - 0.5 100 - 27.0% 25.4 mm 0.3937 15 mm 1 inch 0.5905.. 0.5905 and 0.5 100 15.3% 25.4 mm 0.5905 20 mm 1 inch 0.7874.. v, 0.7874 - 0.75 100 - 4.7% 25.4 mm 0.7874 25 mm 1 inch 0.9843.. b, 0.9843 - 1.0 100 and 1.6% 25.4 mm 0.9843 Negative percentage implies that the metric nut is smaller than the SAE wrench; a positive percentage means that the nut is bigger than the wrench. Thus, in determining the 2% fit, 1 in the wrench key will fit 25mm nuts. Other wrenches cannot be used. C 2008 Pearson Education South Asia Pte Ltd. All rights reserved. This publication is copyrighted and permission must be obtained from the publisher prior to any prohibited reproduction, storage in the search system, or transmission in any form or by any means, electronic, mechanical, photocopying, recording or as well.2Problem 12.7 Suppose the height of Mount Everest Solution: known between 29,032 feet and 29,034 feet. Based on this information, how many significant figures can (a) h1 and 29032 ftyou express height (a) in the legs? (b) Metres away? h2 - 29,034 feet Two heights equal if rounded to four significant digits. The fifth digit doesn't make sense. Four: h 29,030 feet (b) In meters we have h1 and 29,032 feet 1m 8848.52 m 3,281 feet h2 and 29,034 feet 1m 8849.13 m 3,281 feet These two heights are equal if rounded to three significant figures. The fourth digit doesn't make sense. Three: h 8850 mProblem 12.8 Maglev (magnetic levitation) train from Shanghai to Pudong Airport reaches speeds of 430 km/h. Determine its speed (a) in mi/h; (b) ft/s.Solution: (a) v 430 km 0.6214 miles and 267 mph v 267 mph 1 km (b) v 430 km 1000 m 1ft 1 h and 392 ft/s 1 km .3048 m 3600 sv and 392 ft/sProblem 12.9 In the 2006 Winter Olympics, the men's decision:15-kilometer ski race was won by Andrus Veerpalu from Estonia in 38 minutes, 1.3 seconds. (a) v 15 km 60 min. 23.7 km/h v - 23.7 km/h. Determine its average speed (the distance traveled by divi- dd by the required time) to three significant figures (a) in 38 and 1.3 min 1 km/h; b) in mi/h. 60 (b) v (23.7 km/h) 1 mi - 14.7 mi/h v 14.7 mi/h 1.609 kmc 2008 Pearson Education South Asia Pte Ltd. All rights reserved. This publication is copyrighted and permission must be obtained from the publisher up to 3to any prohibited playback, storage in the search system, or transmission in any form or by any means electronic, photocopying, recording or so. Problem 12.10 Porsche engine exerts 229 ft-pound (foot-pounds) of torque at 4600 rpm. Solution: 1m - 310 nm T - 310 Nm 3,281 feet - 229 ft-pound 1 N 0.2248 lbProblem 12.11 Kinetic human energy in Active Solution:12.1 determined 1 mv2, where m its weight T 1224 kg-m2/s2 1 bullet 1 ft 2 2 14.59 kg and V is its speed. The weight of the man is 68 kg, and his kinetic energy is 1 (68 kg) 2 (6 m/s) 2 (6 m/s) 2 and 1224 kg-m2. What is his kinetic energy in T No 903 bullets-ft2/sU.S. Ordinary units? Problem 12.12 Acceleration due to gravity in the sea Solution: Use table 1.2. Result: the level in SI units is g 9.81 m/s2. By converting units, use this value to determine acceleration due to grav-m 1 ft g 9.81 s2 .3048 m . . . s2 and 32.2 s2ity at sea level in ordinary U.S. units. The problem of 12.13 Furlong in two weeks is a humorous solution: 1 furlong 3600 s 24 hr 14 dayunit speed may have amounted to a student as 660 ft hours 1 day 1 two weeks commented on the bewildering variety of units V 2 m/s 1 ftengineers should deal with. Furlong is 660 feet (1/8 miles). 0.3048 mA two weeks 2 weeks (14 nights). If you go to classat 2 m/s, what is your speed in furlongs for two weeks to V 12000 furlongs3 significant figures? fortnightProblem 12.14 Identify the transverse area of the solution: beam (a) in m2; (b) in in2. A (200 mm)2 - 2 (80 mm) (120 mm) - 20800 mm2, 1 m 2 (a) A 20800 mm2 1000 mm 8 m240 mm (b) A 20800 mm2 2 in 2 A 32.2 in2120 mm x 25.4 mm and 32.2 in 240 mm 40 mm 200 mm 200 mm from 2008 South Education Pte Ltd. All rights are reserved. This publication is copyrighted and permission must be obtained from the publisher prior to any prohibited playback, storage in the search system, or transmission in any form or by any means, electronic, mechanical, photocopying, recording or as well.4Problem 12.15 Cross-area yC12×30 American Standard Channel steel beam is No 8.81 inches. What is its transverse area in mm2? ASolution: A 8.81 in2 25.4 mm 2 x 1 in 5680 mm2Problem 12.16 Pressure Converter measures the value of the Solution: Conversion units using table 12.2 and definition of 300 lb/in2. Determine the value of the pressure in the Pascal block. Result: Pascal. Pascal (Pa) is one Newton per meter squared. 12 in 2 1 ft 2 lb 4.448 N 300 in 2 1 pound 1 ft.3048 m and 2.0683 . . . (106) N 2.07 (106) Pa m2Problem 12.17 horsepower is 550 ft-pound/s. Power 1 N-m/s. Determine how many watts are generated by passenger aircraft engines if they produce 7,000 horsepower. Solution: 1m 1 th 5.22 × 106 W 3,281 ft 0.2248 lb 7000 hp 550 ft-pound/ 1 hp 5.22 × 106 WProblem 12.18 On the beams are expres- Solution: 1m and 27.4 lb/ft w 27.4 lb/ftsed per unit of strength per unit of length. If the value of 3,281 ftdistributed load is 400 H/m, what is its value per pound/foot?. w 400 N/m 0.2248 lb 1Nc 2008 Pearson Education South Asia Pte Ltd. All rights are reserved. This publication is copyrighted and permission must be obtained from the publisher up to 5to any prohibited reproduction, storage in the search system, or transmission in any form or by any means, electronic, mechanical, photocopying, recording or similar manner. Problem 12.19 Moment of rectan-solution inertia: the gull area about the axis x is given by the equation I and 1 bh3 . a) I am - 1 mm) (100 mm)3 - 66.7 × 106 mm4 3 (200 3 Area Dimensions - b - 200 mm and h - 100 mm. Identify the value of I to four significant (b) I and 66.7 × 106 mm4 1m 4digits in terms of (a) mm4; b) m4; c) In4. 1000 mm and 66.7 × 10-6 m4 y 4 (c) I 66.7 × 106 mm4 1 in No 160 in4 25.4 mm x bProblem 12.20 In example 12.3, instead of Einstein's solution, let's look at the L and mc equation, where the mass is in kilograms, and the speed of light C is in meters (a) L and mc ⇒ units (L) and kg-m/sper second. (a) What are SI L units? (b) If the L in SI units is 12, what is the value in the U.S. (b) L 12 kg/s 0.0685 bullets 3.281 feet and 2.70 bullet-feet/sCustomay base units? 1 kg 1 m l 2.70 slug-foot/problem 12.21 Equation Solution: σ - Moy (a) Moy (N-m) m N I σ y m2 I m4is is used in the mechanics of materials to determine abnormal stresses in beams. Moy (2000 N-m) (0.1 m) 1 pound 0.3048 m 2 σ (a) When this equation is expressed in terms of the BASE of SI (b) I 7 × 10'5 m4 4.448 N ft units, M is in Newton meters (N-m), y is in meters (m) and I am meters to the fourth force (m4). 59,700 pounds What are SI units σ? if M 2000 N-m, y 0.1 m, and I - 7 × 10-5 m4, what is the cost of σ in the basic units of the UNITED States? Problem 12.22 Acceleration due to gravity on the solution: the surface of the Moon is 1.62 m/s2. (a) What would be a) Mass does not depend on location. Weight in kg ismass from C-clamp in Active Example 12.4 be at 0.0272 bullets 14.59 kg and .397 kg mass 0.397 kg 1 slug of the moon? (b) What weight (b) is the weight on the surface of the moon 0.5-clips in the newtons on the surface of the moon? W y mg (0.397 kg) (1.62 m/s2) 0.643 N W 0.643 N c 2008 Pearson Education South Asia Pte Ltd. All rights reserved. This publication is copyrighted and permission must be obtained from the publisher prior to any prohibited reproduction, storage in the search system, or transmission in any form or by any means, electronic, mechanical, photocopying, recording or as well.6Problem 12.23 1 ft × 1 ft × 1 ftweighs 490 pounds at sea level. Determine the weight in the new- 1 fttons 1m × m × 1 m cube of the same material at sea level. Solution: 490 pounds Weight density is y 1 foot3S20 1 m3 Cube: W and 490 lb (1 m) 3 1 ft 3 1N 77.0 KN 1 ft3 0.3048 m .2248 poundProblema 12.24 Pacific area is solution: Ocean volume 64 186 The 000-square-mile and its average depth is 12,925 feet V (64,186,000 miles) (12.92 5 feet) 5,280 feet 2Assume, which weighs 1 mile and 2,312 × 1019 ft3is 64 pounds/foot3. Determine the mass of the Pacific Ocean (a) in bullets; (b) In kilograms. a) m 64 lb/foot3 (2,312 × 1019f t3) - 4.60 × 1019 slugs 32.2 ft/s2 (b) m 2 m4.60 × 1019 slugs) 14.59 kg and 6.71 × 1020 kg 1 slugProblem 12.25 Acceleration due to gravity in the solution: Use Eq. (12.3) a . Solution for mass, sea level is g 9.81 m/s2. The radius of the Earth R2is 6370 km. Universal gravitational constant m/s2(6370 km)2 103 m 2G and 6.67 × 10-11 N-m2/kg2. Use this information for gR2 km (9.81 Earth mass. G mE - N-m2 kg2 6.67 (10-11) - 5,9679 . . . (1024) kg and 5.97 (1024) kgProblem 12.26 Man weighs 800 H sea level. Solution: Use Eq. (12.5). The Earth's radius is 6,372 km. What force has on a person the gravitational pull of Earth W and mg RE 2 WE g RE 2 6372 2if it is on the space station in an orbit of 322 km above r g RE and H 6372 and 322Infver earth? We (800) (0.9519) 262 NProblem 12.27 Acceleration due to gravity on the solution: the surface of the Moon is 1.62 m/s2. The radius of the Moon is 1738 km. (a) W y mgM (10 kg) (1.26 m/s2) 12.6 H W and 12.6 N(a) What is the weight of the Newtons on the surface (b) Adaptation of the equation 1.4 we have aM and gM 2 Moon object that has a mass of 10 kg? R. Force (b) Using the approach described in example 12.5, the de-term force exerted on an object grav-something 2 ity of the Moon if the object is 1738 km above the surface of the Moon. F-maM (10 kg) (1.62 m/s2) 1738 km , 4.05 N 1738 km. All rights are reserved. This publication is copyrighted and permission must be obtained from the publisher up to 7to any prohibited reproduction, storage in the search system, or transmission in any form or by any means, electronic, mechanical, photocopying, recording or similar manner. Problem 12.28 If an object is near the surface of the Solution: Use eq variation. Earth, the change of its weight at a distance from the center of the Earth can often be ignored. Accelerator-W and mg RE 2ation due to gravity at sea level is g 9.81 m/s2. The land length of RE and hradius is 6,370 km. The weight of the object is 0.99 mgate of sea level is a mg, where the m is its mass. At what altitude does the earth reduce the weight of the object For radial height, to 0.99 mg? 1 h and RE √ 1 1.0) 0.99 and 32.09 . . . Km 32100 m and 32.1 kmProblem 12.29 Planet Neptune has an equatorial diameter of 49,532 km and its mass is 1.0247 × 1026 kg. If the planet is modeled as a homogeneous sphere, what is acceleration due to gravity on its surface? (Single gravitational constant G - 6.67 × 10-11 h-m2/kg2.) Решение: W и G mN m n mN m ⇒ gN и G mNWe имеют: rN2 r2 rN2Note, что радиус Нептуна составляет rN No 1 (49,532 км) 2 24 766 км N-m2 1.0247 × 1026 кгТус rH 6,67 × 10-11 кг2 (24766 км)2 × 1 км 2 1000 м и 11,1 м/с2 гн 11,1 м/с2Проблем 12,30 В точке между землей и раствором: Пусть rEp be расстояние от Земли до точки, где луна, величина силы, оказываемой на объекте земной гравитации равна величине силы гравитационных ускорений одинаковы, и пусть rMp быть расстояние, на котором объект гравитации Луны. That from the moon to this point. Then, rEp and rMp rEM 383,000 km.the distance from the center of the Earth to this point The fact that the gravitational sights of the Earth and the Moon are three significant figures? The distance from the center of the Earth to the center of the Moon is 383,000 km, at the moment the equal result in the equation of the radius of the Earth is 6,370 km. Their radius is 1,738 km, and the acceleration due to gravity on the surface of GE RE 2 RM 2its is 1.62 m/s2. rEp and gM rMp, where rEM 383,000 km. Replacing the correct numerical values leads to the equation m 6370 km 2 m 1738 km 2 9.81 s2 rEp s2 , 1.62 rEM and rEp, where rEp is the only unknown. By solving the problem, we get rEp 344 770 km and 345,000 km. c 2008 Pearson Education South Asia Pte Ltd. All rights are reserved. This publication is copyrighted and permission must be obtained from the publisher before any prohibited playback, storage in the search system, or transmission in any form or by any means, electronic, mechanical, photocopying, record or as well.8Problem 13.1 In example 13.2, suppose that vehi-cle fell from a height h h y 6m. (a) What is the speed down 1 after it is released? What is the downward speed before it reaches the ground? Solution: Equations regulating movement: a s g - 9.81 m/s2v - 1 gt 2, h h 2 s(a) v The rate of decline is 9.81 m/s. (b) We must first determine the time, into which the vehicle hits the ground with No 0 ⇒ and 1 gt 2 106 with 2 g 9.81 m/s2 Now we can decide for speed v rate of downgrade is 10.8 m/s Problem 13.2 Fraser machine is programmed so that in the interval of time from t 0 to t 2 s, the position of its head (in inches) is given as a function of time s 4t and 2t3. What is the speed (s) and (in/s2) heads on t 1 s? Solution: The movement is governed by equations No (4 v/s)t (2 in/s2)t2,v (4 in/s) - 2 (2 in/s2)t, a q2 (2 in/s2). At t q 1 s, we have v No 0, No 4 in/s2.c 2008 Pearson Education South Asia Pte Ltd. All rights are reserved. This publication is copyrighted and permission must be obtained from the publisher up to 9to any prohibited reproduction, storage in the search system, or transmission in any form or by any means, electronic, mechanical, photocopying, recording or similar manner. Problem 13.3 In an experiment to evaluate axel-seration due to gravity, the student throws the ball at a distance of so0of 1 m above the floor. His lab partner measures the time it takes to fall, and gets a score of 0.46pc. (b) Let's be positioning the ball in relation to the floor. Using the acceleration value due to the gravity they received and assuming that the ball is released at t No 0, define s (in m) as a function of time. Solution: The area of guiding equations when the ball hits the floor, We have ⇒ 0 (0.46 s)2 g and 9.45 m/s2 (b) Distance s then given s 1 (9.45 m/s2) 2Problem 13.4 Boat position at interval Time from t 2 c to t 10 with given s 4t 1.6t2 - 0.08t3 m. (a) Determine the speed of the boat and acceleration at t 4 s.(b) What is the maximum speed of the boat during this time interval, And when does it happen? Solution: s 4t - 1.6t2 - 0.08t3 a) v(4s) ⇒ - 12.96 m/s2v dt b) a 3.2 - 0.48t - 0 ⇒ t . 6.67sa - dv 3.2 - 0.48t v (6.67s) - 14.67 m/s dt c 2008 Pearson Education South Asia Pte Ltd. All rights reserved. This publication is copyrighted and permission must be obtained from the publisher prior to any prohibited playback, storage in the search system, or transfer in any form or by any means, electronic, mechanical, photocopying, recording or as well.10Problem 13.5 Rocket starts with a rest on t 0 andtravels straight up. Its height above the ground as the dysfunction of time can be approximated to s bt2 and ct3, where b and c are constants. At the speed and acceleration of the rocket 229 m/s and 28.2 m/s2. Determine the time during which the rocket reaches a personal speed (325 m/s). What is its height when it happens? Solution: Steering equations ares - bt2 - ct3, sv - 2bt - 3ct2, a 2b - 6ct. Using the information we have allows us to decide for constantsb and c. (229 m/s) 2b (10 s) 3c (10 s)2, (28.2 m/s2) 2b and 6c (10 s). By solving these two equations, we find b 8.80 m/s2, with 0.177 m/s3. When the rocket reaches supersonic speed, we have (325 m/s) m/s2) t 3 (0.177 m/s3) t2 ⇒ t 13.2 s. Height at this time - 1940 m. (8.80 m/s2) (13.2 s)2 (0.177 m) /s3) (13.2 s)3Problem 13.6 Position point within the inter-1val time from t 0 to t 6 s is given s - 2 t 3 6t2 and 4t m.(a) What is the maximum speed during this time interval, and at what time does it occur? What is the acceleration when the speed is maximum? Solution: The maximum speed occurs where q dv No 0 (it can be minimal) dts - 1 t 3 - 6t2 y 4tm 2 da This happens at t 4 s. At the moment - No.3, so we have maximum.v - 3 t 2 - 12t 4 m/s 2 dt (a) Maximum speed is at t 4 s., where v 28 m/s and (b) 0 m/s2a and 3 t 12 m/s2c 2008 Pearson Education Asia South Pte Ltd. This publication is copyrighted and permission must be obtained from the publisher up to 11to any prohibited playback, storage in the search system, or transmission in any form or by any means electronic, mechanical, photocopying, recording or similar manner. Problem 13.7 Point Position during the inter-It's really the maximum since d2v No. 6 qlt; 0. The maximum length of time from t 0 to t - 3 seconds is s - 12 - dt25t2 - t3 m. Speed (a) What is the maximum speed during this interval v 10t - 3t2 t'1.667 and 8.33 m/s of time, and at what time is it? Acceleration occurs at top speed. (b) What is the acceleration when the speed is a maximum of 0? Solution: (a) Speed ds 10t and 3t2. Maximum occurs when dt dv 10 - 6 t 0, of which dt t - 10 - 1.667 seconds. 6 dtProblem 13.8 Rotating handle causes Pof point P position as a time function to be s 0.4 sin s (2't) m.a) Determine speed and acceleration P at t 0.375 s.(b) What is the maximum speed value of P? c) When the P speed is the maximum, what is the acceleration of P? Solution: 0.4 sin (2x) a) v (0.375s) ⇒ - 1,777 m/cm vmax - 0.8 x 2.513 m/s2a, two - 1.6 2 sins (2) in) vmax ⇒ t 0, nude ⇒ a 0 dtProblem 13.9 For the mechanism in the problem 13.8, Solution:draw graphics position s, speed v, and acce-leration a P point as time functions for 0 ≤ t ≤ 2 s.Using graphs, confirm that the tilt of graphof s is zero at times, for which v is zero, and the tilt of the graph v is zero at times for which zero. C 2008 Pearson Education South Asia Pte Ltd. All rights reserved. This publication is copyrighted and permission must be obtained from the publisher prior to any prohibited reproduction, storage in the search system, or transmission in any form or by any means, electronic, mechanical, photocopying, recording or as well.12Problem 13.10 Seismograph measures horizon-tal movement during the earthquake. Engi-neer, analyzing the data, determines that for the 10-time interval starting with t No 0, the position is approximately s 100 cos (2't) mm. What a) maximum cycling path and (b) maximum acceleration of the base of the 10th interval? Solution: b) Acceleration:a) Speed isds d2s and No0.4 '2 cos (2't). - (2')100 sin (2't) mm/s . dt2dt Acceleration maxim occur at maxima occur atdv No 0.4 '2 cos (2't) 0, d3s y d2v y 0.8'3 sin (2't) 0.dt dt3 dt2from which 2't n' , or t n n 0, 1, 2. . K, where , n 22 t (2n and 1)π or t (2n y 1) K ≤ 10 seconds. , , 2 24 These acceleration highs have an absolute value of Nos. 1, 2, 3, ... M where (2M and 1) ≤ 10 seconds. 4These maximum speeds have an absolute value dv n q 0.4'2 and 3.95 m/s2. dt t' 2ds - 0.2 - 0.628 m/s.dt (2n'1) t 4Problem 13.11 In the assembly operation, the robot's weapon moves in a straight horizontal line. During the aninterval time from t 0 to t 1 s, the position of the weapon is given s 30t2 and 20t3 mm. (a) Determine the maximum speed during this time interval. What is the position and acceleration at top speed? Solution: v (60) 1 - 60 1 mm/s 24 with 30t2 - 20t3 mm in 15 mm/sv 60t 60t2 mm/s (b) Position and acceleration in this time area 60 - 120tm/s2 s . 7.5 - 2.5 mmda - 120 mm/s3 with 5 mm Hg. Article 0 mm/s2 (a) Maximum speed occurs when dv - 0. This occurs at dt 0 and 60 - 120t or t 1/2 second. (since yes/lt; 0, we have a maximum). Speed at this time isc 2008 Pearson Education South Asia Pte Ltd. All rights reserved. This publication is copyrighted and permission must be obtained from the publisher up to 13to any prohibited reproduction, storage in the search system, or transmission in any form or by any means, electronic, mechanical, photocopying, recording or similar manner. Problem 13.12 In active example 13.1, accelerator- Solution: Steering equations aretion (in m/s2) point P relative to point O is given asa time function at 3t2. Suppose that at t q 0 a (3 m/s4) t2position and P speeds are s 5 m and v 2 m/s. v 1 m/s4)t 3 (2 m/s) (3Determine position and speed P at t q 4 s. 3 OP s 1 (3 m/s4)t4 (2 m/s) t (5 m) s 12 S t y 4 s, we have s 77 m, v 66 m/s.Problem 13.13 Porsche starts with rest on time No 0. During the first 10 seconds of its movement, its speed of km/h is given as a function of time at v 22.8t and 0.88t2, where t is in seconds. a) What is the maximum acceleration of the car in m/s2, and when does it occur? (b) How far in a kilometre did the car travel 10 seconds? Solution: First convert the numbers into meters and seconds km 1000 m 1hr and 6.33 m / s22.8 hours 1 km 3600 from km 1000 m 1 hour 0.244 hr 1 km 3600 s Rule equations then 1 m/s) (t2/s) 1 m/s) (t 3/s2), (6.33 (0.88 23v) (6.33 m/s) (6.33 m/s) (((((0.88 23v) (6.33 m/s) ((((t/s) - (0.88 m/s) (t2/s2), and -2 (6.33 m/s) - 2 (0,0,0,. 88 m/s) (t/s2), d-2 (0.88 m/s) (0.88 m/s) (1/s2) - 1.76 m/s3.dt.Maximum acceleration occurs at t No 0 (and decreases linearly from its original value). 10 s)2 1 km (10 s)3 1 hour 22.8 - 0.88 3600 s 2 hours s3 hr s2s - 0.235 km. c 2008 Pearson Education South Asia Pte Ltd. All rights are reserved. This publication is copyrighted and permission must be obtained from the publisher prior to any prohibited reproduction , storage in the search system, or transmission in any form or by any means, electronic, mechanical, photocopying, recording or as well.14Problem 13.14 Acceleration point is - at t 0, s 40 m, thus C2 and 40. Position 20t m/s2. When t 0, with 40 m and 10 m/s. 10 t3 x 10t and 40 m. What is the position and speed on t 3 s? 3Decision: Speed at t 3 seconds, v th dt s C1, where C1 is a constant integration. Thus, 20t dt and C1 10t2 and C1. s 10 t3 - 10t - 40 x 100 m. 3 t 3At t 0, in 10 m/s, Hence, C1 - 10, and speed - v 10t2 and 10 m/s. Position - Speed on t 3 seconds v 10t2 - 10 t3 - 80 m/s - v dt s2, where C2 is a constant integration.s (10t2 - 10) dt s2 - 10 t3 and 10t . 3Problem 13.15 Point acceleration is a position of 60t and 36t2 m/s 2. When t 0, with 0 and v 20 m/s. What is position and speed as a function of time? Solution: Speed isv DT DT th C1 (60t and 36t2) s - v dt - C2 (30t2 - 12t3 - 20) - C2At t 0, v - 20 m/s, hence C1 - 20, and speed as a function - 10t3 - 3t4 - 20t - C2.of time is on t 0, s 0, hence, C2 - 0, and position s - 10t3 - 3t4 - 20t m v 30t2 - 12t3 - 20 m/s .c 2008 Pearson Education South Asia Pte Ltd. All rights reserved. This publication is copyrighted and permission must be obtained from the publisher up to 15to any prohibited reproduction, storage in the search system, or transmission in any form or by any means, electronic, mechanical, photocopying, recording or similar manner. Problem 13.16 As a first approximation, bioengineering mechanics of bird flight suggests that thesnow petrel takes off with constant acceleration. The video shows that the bird needs a distance of 4.3 m to take off and moves from 6.1 m/s. What is its acceleration? Solution: The steering equations are constant, v th at, s 1 at2. Using the information provided, we have 26.1 m/s. 2Decising these two equations, we find t 1.41 s and 4.33 m/s2. Problem 13.17 Gradually developing a more real model, bioengineer following models acceleration of snow petrels by the equation of form C,1 sin ht), where C and q are constants. From the footage of the bird's take-off, he estimates that 18/s and determines that the bird requires 1.42 hundred takes off and moves at 6.1 m/s when it does. What is Permanent C? Solution: We find expression for speed, Integrating theaccelerationa - C (1 - sin) , v - Ct q C (1 - cos t) - C t We have 6.1 m/s. C 1.42 s s s s cos'18 (1.42) 18 18Shooth is the equation, we find C 4.28 m/s2. C 2008 Pearson Education South Asia Pte Ltd. All rights reserved. This publication is copyrighted and permission must be obtained from the publisher prior to any prohibited playback, storage in the search system, or transfer in any form or by any means, electronic, mechanical, photocopying, record or as well.16 Page 2 Published by Marvin Underground Latino USA, 2018-08-06 16:17:16:32:32:32:37:37:37 libro bedford dinamica 5ta edicion pdf. libro de dinamica bedford fowler y solucionario. libro de bedford dinamica. solucionario del libro de dinamica de bedford. libro dinamica bedford 5ta edicion. descargar libro de dinamica bedford