

國立彰化師範大學 101 學年度碩士班招生考試試題

系所： 車輛科技研究所

科目： 動力學

☆☆請在答案卷上作答☆☆

共 2 頁，第 1 頁

- 1、 Milk is poured into a glass of height 140mm and inside diameter 66mm, as shown in Fig.1. If the initial velocity of the milk is 1.2m/s at an angle of 40° with the horizontal, determine the range of value of the height h for which the milk will enter the glass. (15%)

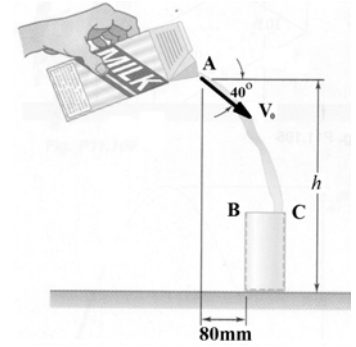


Fig. 1

- 2、 As cam A rotates in Fig. 2, follower wheel B rolls without slipping on the face of the cam. Knowing that the normal components of the acceleration of the points of contact at C of the cam A and the wheel B are 26 in./s^2 and 267 in./s^2 , respectively, determine the diameter of the follower wheel. (15%)

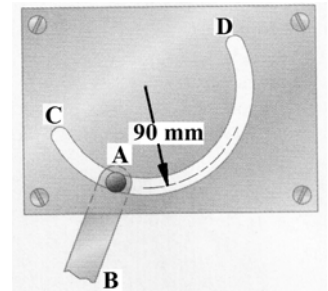


Fig. 2

- 3、 Block A has a mass of 40kg, and block B has a mass of 8kg, as shown in Fig. 3, the coefficients of friction between all surface of contact are $\mu_s = 0.20$ and $\mu_k = 0.15$. If $P = 40\text{N} \rightarrow$, determine (a) the acceleration of block B, (b) the tension in the cord. (20%)

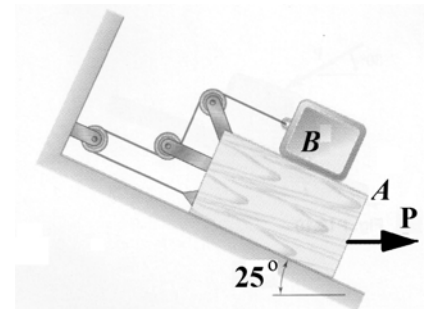


Fig. 3

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共 2 頁，第 2 頁

- 4、 The 0.5-lb pellet is pushed against the spring at A and released from rest. Neglecting friction, determine the smallest deflection of the spring for which the pellet will travel around the loop ABCDE and remain at all times in contact with the loop. (10%)

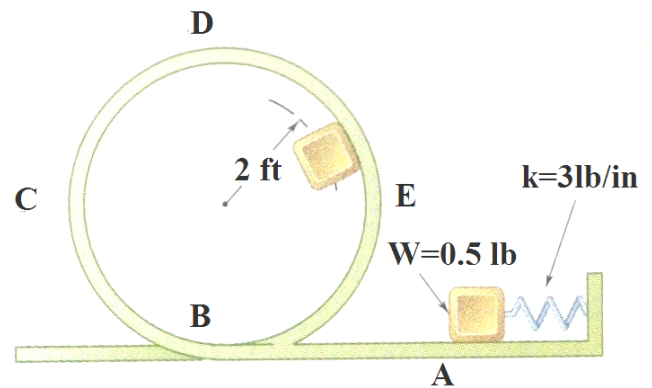


Fig. 4

- 5、 Fig. 5 is a game of pool. Ball A is moving with a velocity, where V_0 when it strikes balls B and C which are at rest and aligned as shown in Fig. 5. Knowing that after the collision the three balls move in the directions indicated and that $v_b = 12 \text{ ft/s}$ and $v_c = 6.29 \text{ ft/s}$, determine the magnitude of the velocity of (a) ball A, (b) ball B. (20%)

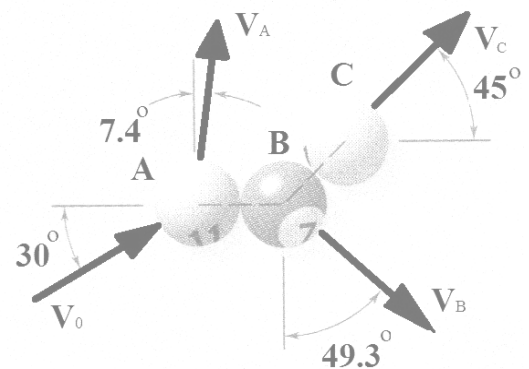


Fig.5

- 6、 In the planetary gear system shown in Fig. 6, the radius of gears A, B, C, and D is 3 in, and the radius of the outer gear E is 9 in. Knowing that gear E has an angular velocity of 120 rpm clockwise and that the central gear has an angular velocity of 150 rpm clockwise, determine (a) the angular velocity of each planetary gear, (b) the angular velocity of the spider connecting the planetary gears. (20%)

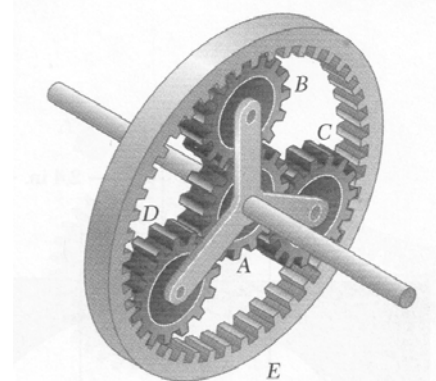


Fig.6