

國立彰化師範大學103學年度碩士班招生考試試題

系所： 車輛科技研究所

選考 4

科目： 動力學

☆☆請在答案紙上作答☆☆

共 2 頁，第 1 頁

1. As shown in Fig. 1, the assembly of rod A and wedge B starts from rest and moves to the right with a constant acceleration of 2 mm/s^2 . Determine (a) the acceleration of wedge C. (b) the velocity of wedge C when $t=10 \text{ s}$. (20%)

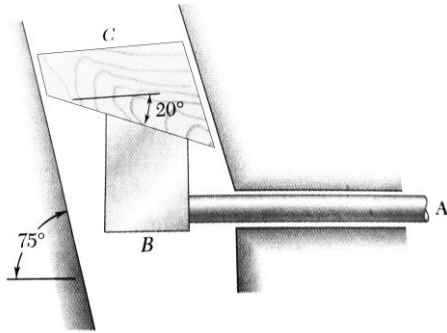


Fig. 1

2. The bob of a 2-m pendulum describes an arc of circle in a vertical plane. If the tension in the cord is 2.5 times the weight of the bob for the position shown in Fig. 2, find the velocity and the acceleration of the bob in that position. (20%)

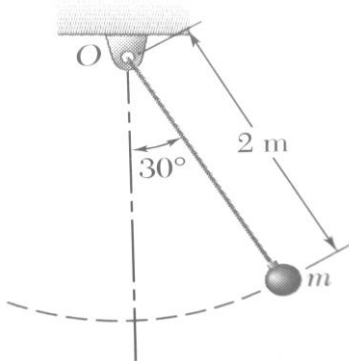


Fig. 2

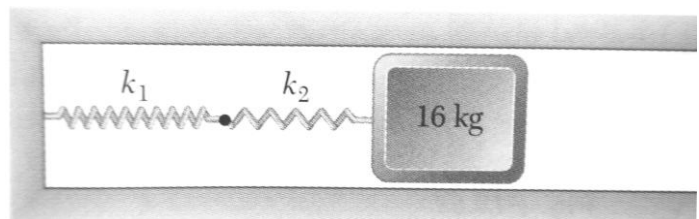


Fig. 3

3. As shown in Fig. 3, a 16-kg block can slide without friction in a slot and is connected to two springs of constants $k_1=12 \text{ kN/m}$ and $k_2=8 \text{ kN/m}$. The springs are initially unstretched when the block is pulled 300 mm to the right and released. Determine (a) the maximum velocity of the block, (b) the velocity of the block when it is 120 mm from its initial position. (20%)

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4. As shown in Fig. 4, knowing that crank AB rotates about point A with a constant angular velocity of 900 rpm clockwise, determine the acceleration of the piston P when $\theta = 60^\circ$. (20%)

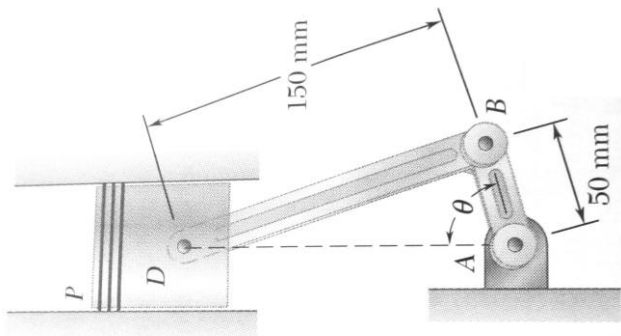


Fig. 4

5. As shown in Fig. 5, a uniform slender rod of length $L=36$ in. and weight $W=4$ lb hangs freely from a hinge at A . If a force P of magnitude 1.5 lb is applied at B horizontally to the left ($h=L$), determine (a) the angular acceleration of the rod, (b) the components of the reaction at A . (20%)

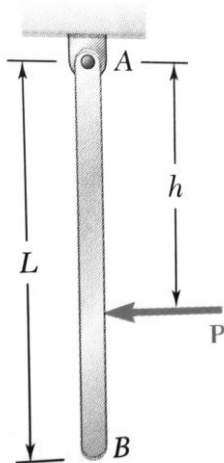


Fig. 5