

所別：光機電工程研究所碩士班 乙組(光機組) 科目：動力學

1.

(1) (選擇題 8 %) 如下 Fig. 1 所示，圓盤 A 質量 2 kg，圓盤 B 質量 4 kg，由皮帶連接，現施以 $M = 2.7 \text{ N}\cdot\text{m}$ 之力矩於 A，則圓盤 B 之角加速度為 (A) 6.25 (B) 7.25 (C) 9.25 (D) 11.25 rad/s^2 。

(2) (8 %) The 150-kg block A shown in Fig. 2 is released from rest in the position shown and pulls the 200-kg log up to the ramp. The coefficient of kinetic friction between the log and the ramp is 0.5. Draw the free-body diagram of the 200-kg log.

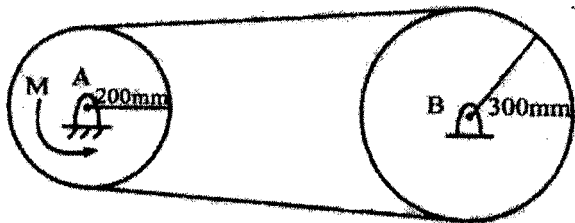


Fig. 1

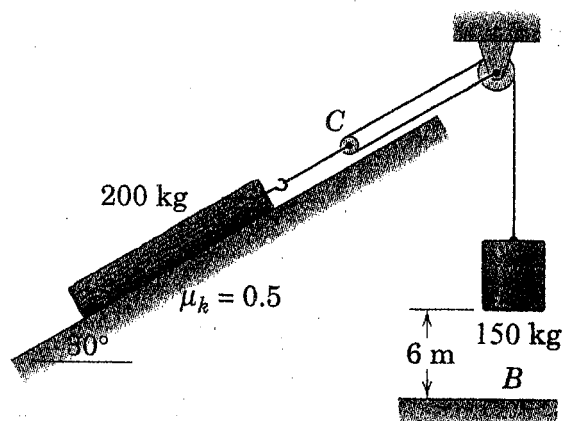


Fig. 2

(3) (9 %) Determine the speed with which block B rises in Fig. 3 if the end of the cord at A is pulled down with a speed of 2 m/s.

2. (25 %) A uniform slender rod AB of mass m and length L shown in Fig. 4 is released from rest in the position shown. Knowing that the impact between knob B and the horizontal surface is perfectly elastic, determine (a) the angular velocity of the rod immediately after the impact, (b) the impulses exerted on the rod at points A and B. (Neglect the masses of the knobs at points A and B and the friction between the knobs and the horizontal surface.)

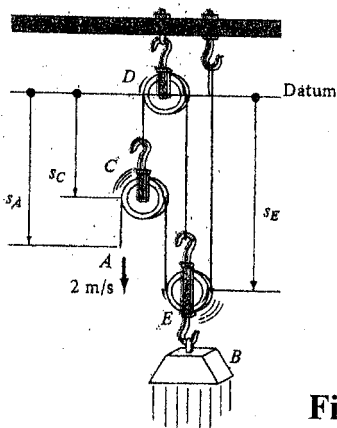


Fig. 3

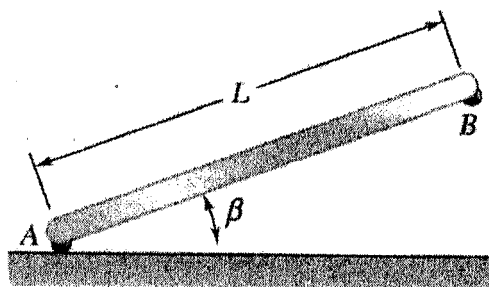


Fig. 4

注意：背面有試題

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3. (25 %) Determine the acceleration of point A and the angular acceleration of the gear shown in Fig. 5 if at the given instant the gear racks have the velocities and accelerations shown.

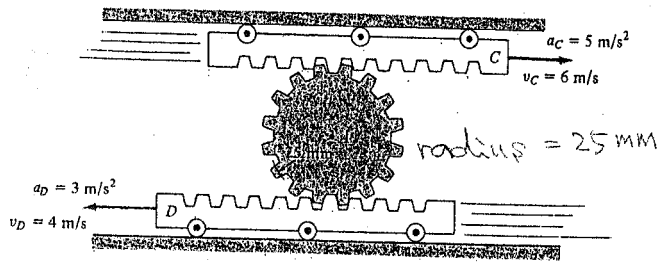


Fig. 5

4. (25 %) As shown in Fig. 6, determine the period τ for small oscillations of the assembly composed of two light bars and two particles, each of mass m .

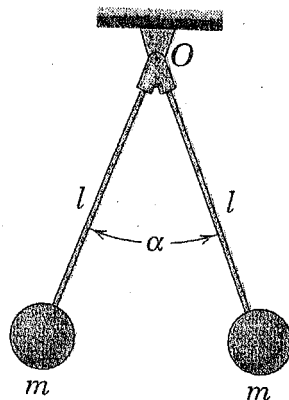


Fig. 6