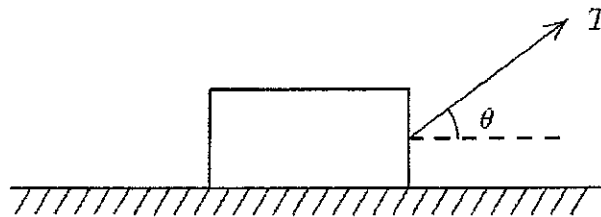


※ 考生請注意：本試題不可使用計算機。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

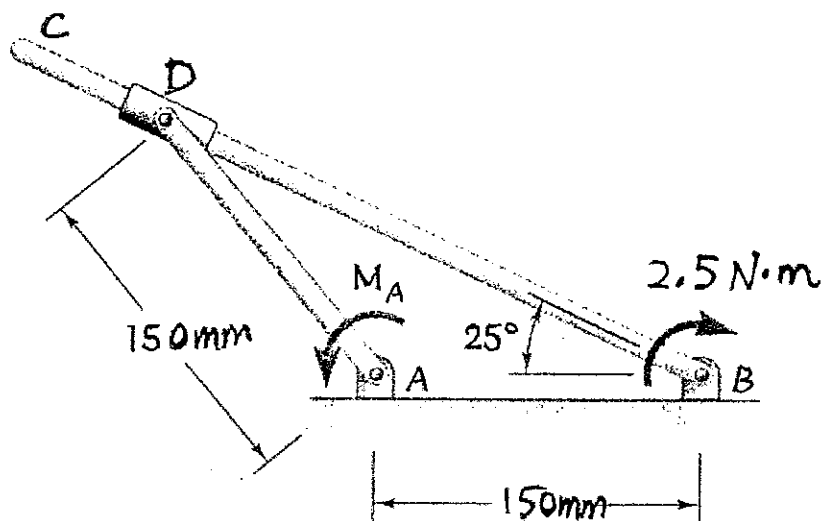
靜力學部分

注意：靜力學共有五題，第一到第三題，每題只有一個答案，第四、第五題為計算題。批改人員將只核對每題的最後答案，計算或誘導過程不必列出。請考生將每題的答案 (若有單位請包含單位) 以方框標註出來，以利批改考卷。

- (3%) If $|\vec{A} - \vec{B}| = A + B$, what is the angle between \vec{A} and \vec{B} ?
- (3%) A block of mass m is pulled along a rough horizontal floor by an applied force \vec{T} as shown. Determine the vertical component of the force exerted on the block by the floor.

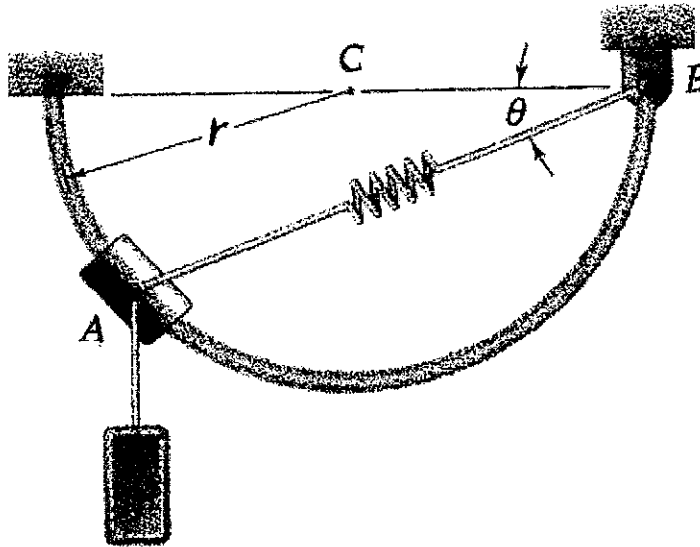


- (4%) Two objects with masses of m_1 and m_2 have the same kinetic energy and are both moving to the right. The same constant force \vec{F} is applied to the left to both masses. If $m_1 = 4m_2$, what is the ratio of the stopping distance of m_1 to that of m_2 ?
- (20%) Two rods are connected by a slider block as shown. Neglecting the effect of friction, determine the couple M_A required to hold the system in equilibrium.



※ 考生請注意：本試題不可使用計算機。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

5. (20%) Collar A can slide freely on the semicircular rod shown. Knowing that the constant of the spring is k and that the unstretched length of the spring is equal to the radius r , determine the value of θ corresponding to equilibrium when $W = 50N$, $r = 90\text{ mm}$, $k = 1.5\text{ kN/m}$.

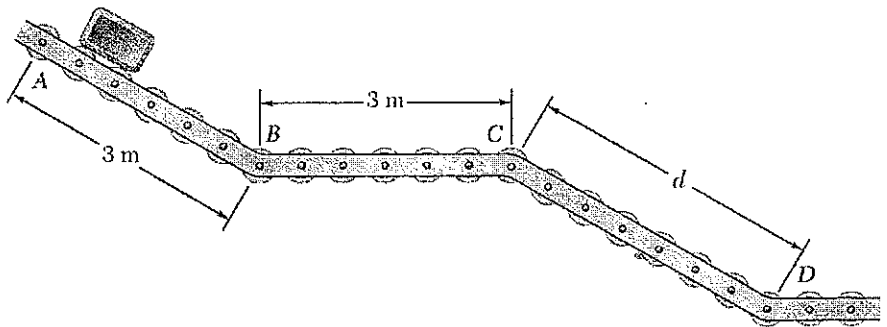


※ 考生請注意：本試題不可使用計算機。 請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

注意：第6至第11題為動力學部分，每題都是單選題，答錯不倒扣分數。批改人員只核對每題的答案 (A-E) 而不核對計算過程。請將每題最接近你的計算結果的答案選項 (A-E) 寫在你的答案紙上並標註題號。若你只寫數值答案，而沒有寫答案選項 (A-E)，則該題以零分計。譬如第6題若你的計算結果是 1.6 m，則應該寫A而非1.6 m。

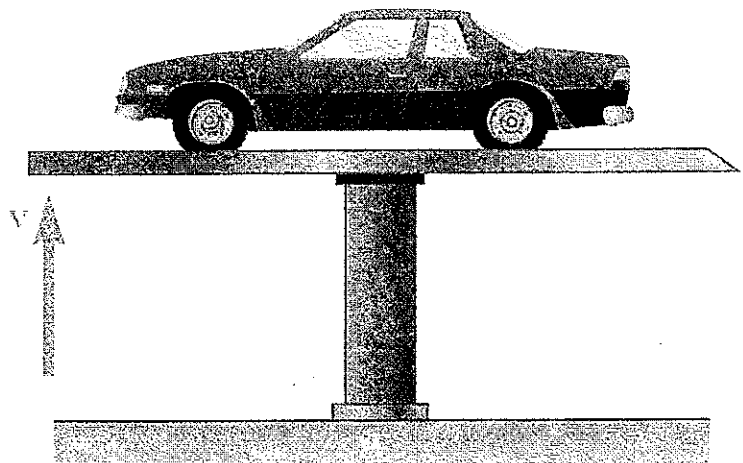
6. (5%) A package is released from rest at A and moves along the wheel conveyor ABCD. The package has a uniform acceleration of 4.8 m/s^2 as it moves down sections AB and CD, and its velocity is constant in section BC. If the velocity of the package at D is 7.2 m/s , what is the distance between C and D?

- (A) 1.6 m
- (B) 2.0 m
- (C) 2.4 m
- (D) 2.8 m
- (E) 3.2 m



7. (5%) It takes 15 seconds to raise a 1200-kg car and the supporting 300-kg hydraulic car-lift platform to a height of 2.8 m. What is the average output power delivered by the hydraulic pump to lift the system?

- (A) 2.75 kW
- (B) 3.15 kW
- (C) 3.55 kW
- (D) 3.95 kW
- (E) 4.35 kW



※ 考生請注意：本試題不可使用計算機。 請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

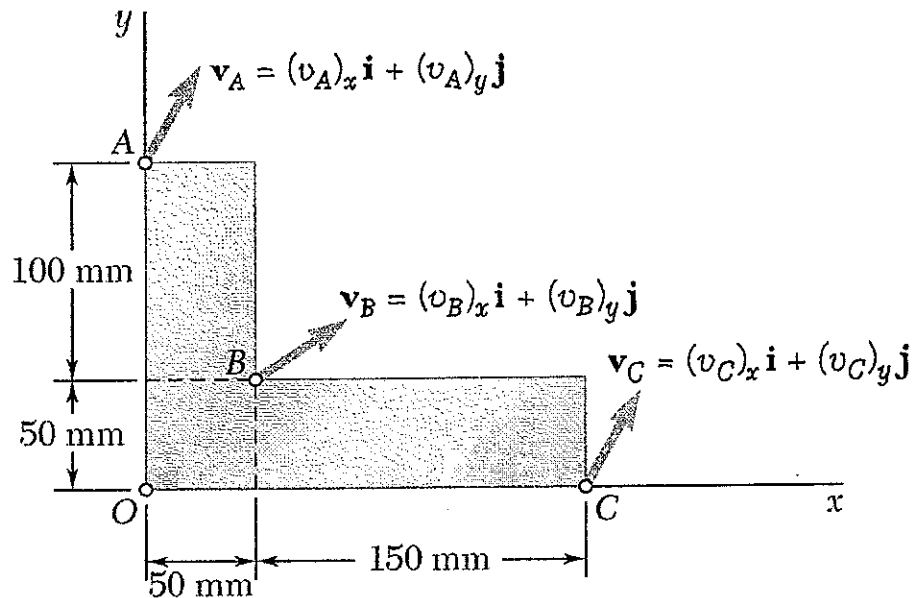
8. (10%) In a hammer thrower's swing, the 7.1-kg head A of the hammer revolves at a constant speed in a horizontal circle. If $\rho = 0.93$ m and $\theta = 60^\circ$, what is the tension in wire BC?
($\cos 60^\circ = 0.5$, $\sin 60^\circ = 0.866$.)

- (A) 40 N
- (B) 50 N
- (C) 60 N
- (D) 70 N
- (E) 80 N



9. (10%) The plate shown moves in the xy -plane. If $(v_A)_x = 300$ mm/s, $(v_B)_x = -100$ mm/s, and $(v_C)_x = -600$ mm/s, what is the magnitude of the angular velocity of the plate?

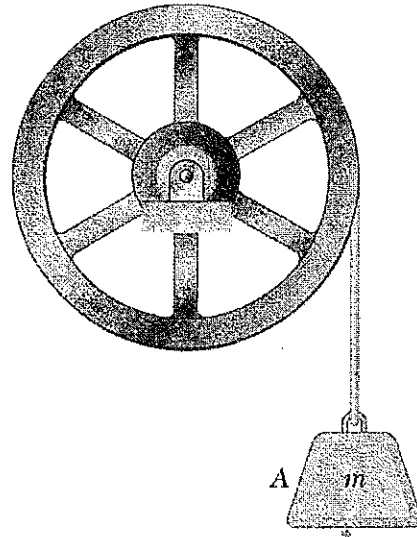
- (A) 3 rad/s
- (B) 4 rad/s
- (C) 5 rad/s
- (D) 6 rad/s
- (E) 7 rad/s



※ 考生請注意：本試題不可使用計算機。 請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

10. (10%) The flywheel shown has a radius of 500 mm, a mass of 120 kg, and a radius of gyration of 375 mm. A 15-kg block A is attached to a wire that is wrapped around the flywheel, and the system is released from rest. If the effect of friction is neglected, what is the magnitude of the acceleration of block A?

- (A) 1.2 m/s²
- (B) 1.4 m/s²
- (C) 1.6 m/s²
- (D) 1.8 m/s²
- (E) 2.0 m/s²



11. (10%) A rope is wrapped around a cylinder of radius r and mass m as shown. If the cylinder is released from rest, what is the magnitude of the angular velocity of the cylinder after it has moved downward a distance s ? (g = gravitational acceleration.)

- (A) $\sqrt{\frac{3gs}{2r^2}}$
- (B) $\sqrt{\frac{4gs}{3r^2}}$
- (C) $\sqrt{\frac{2gs}{3r^2}}$
- (D) $\sqrt{\frac{5gs}{3r^2}}$
- (E) $\sqrt{\frac{3gs}{5r^2}}$

