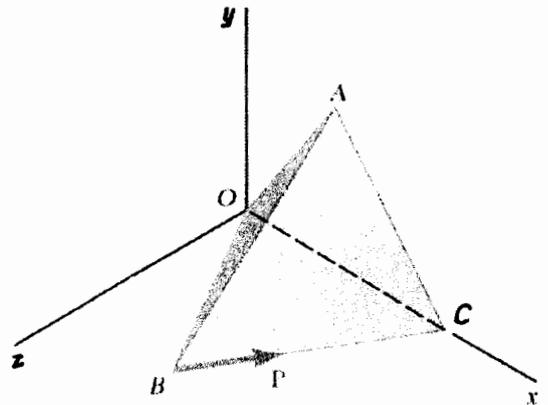


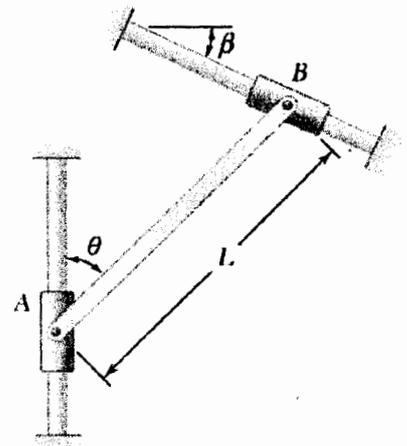
※ 考生請注意：本試題不可使用計算機

注意：本試卷共10題，每題只有一個答案。批改人員將只核對每題的最後答案，計算或誘導過程只作為確認答案來源（以防作弊情形）但不予記分。請考生將每題的最後答案（若有單位請包含單位）以方框標註出來，以利批改作業。重力加速度可以用 $g$ 表示，或以 $10 \text{ m/s}^2$ 計算。

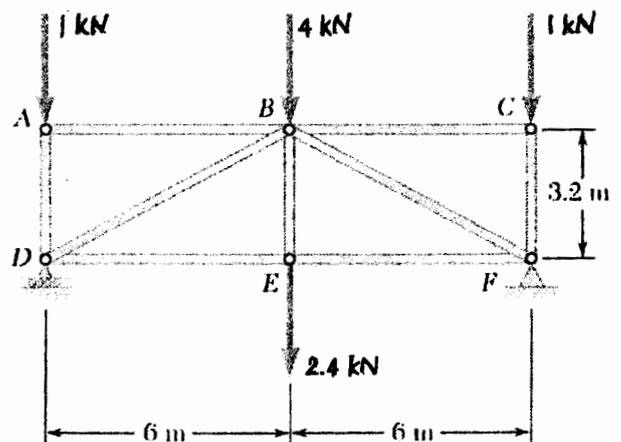
1. (10%) A regular tetrahedron has six edges of length  $a$ . A force  $\mathbf{P}$  is directed along edge  $BC$  as shown. Determine the magnitude of the moment of  $\mathbf{P}$  about edge  $OA$ .



2. (10%) A slender rod of length  $L$  and weight  $W$  is attached to collars that can slide freely along the guides shown. Knowing that the rod is in equilibrium, derive a relation between the angle  $\theta$  and the angle  $\beta$ .



3. (10%) Determine the magnitude of the force in the member  $DE$ .



(背面仍有題目,請繼續作答)

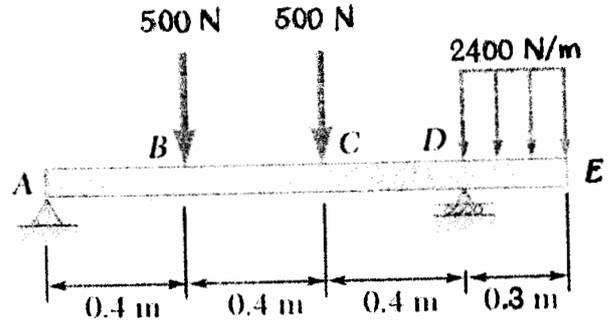
系所組別： 工程科學系丙、戊、己組

考試科目： 工程力學

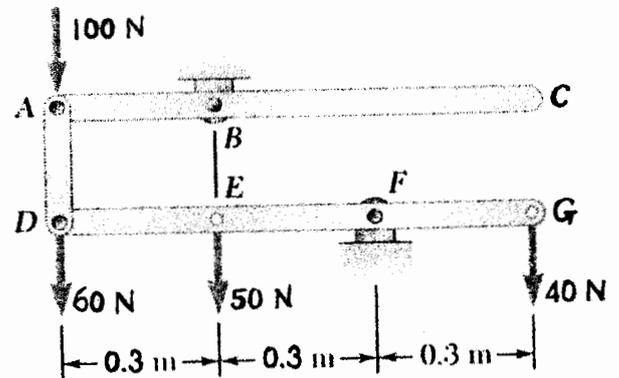
考試日期： 0223，節次： 1

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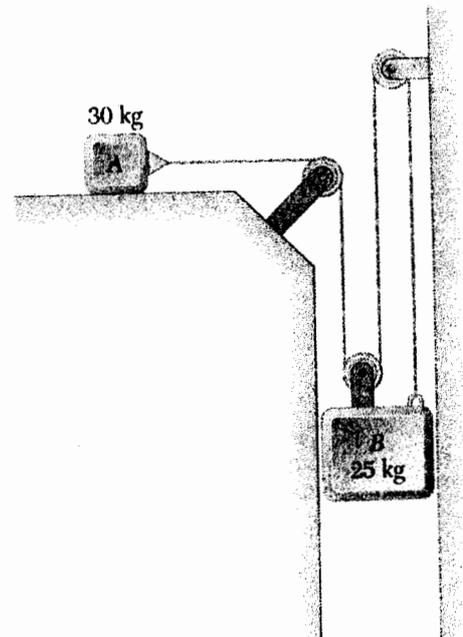
4. (10%) For the beam and loading shown, determine the magnitude of the maximum bending moment in the beam.



5. (10%) Determine the magnitude of the vertical force  $P$  that must be applied at  $C$  to maintain the equilibrium of the linkage.



6. (10%) The two blocks shown are originally at rest. Neglecting the masses of the pulleys and the effect of friction in the pulleys and between block  $A$  and the horizontal surface, determine the magnitude of the acceleration of block  $B$  when the system is released.



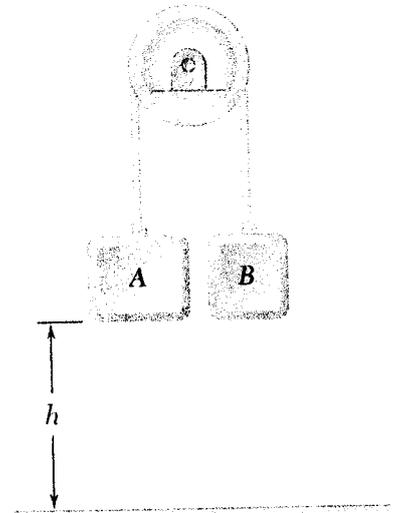
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考試科目： 工程力學

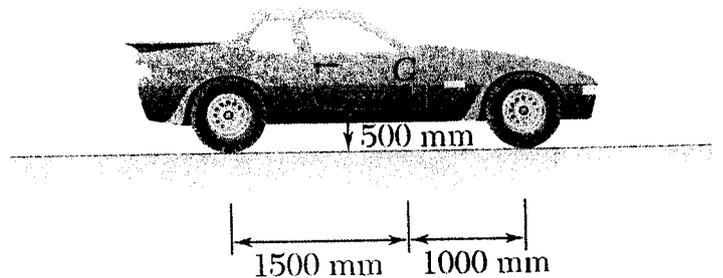
考試日期： 0223，節次： 1

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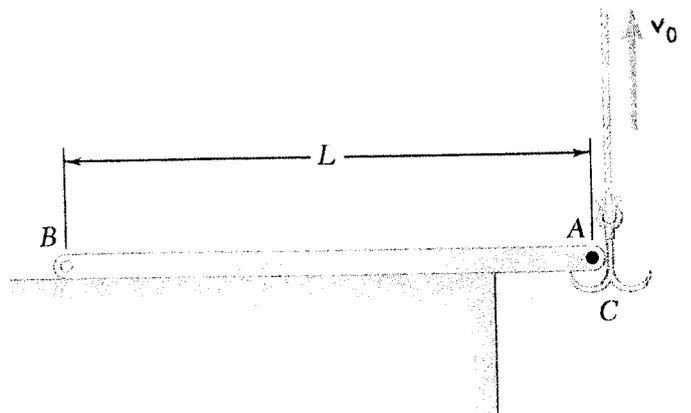
7. (10%) Block *A* and *B* have masses of 11 kg and 5 kg, respectively, and they are both at a height  $h = 2$  m above the ground when the system is released from rest. Just before hitting the ground, block *A* is moving at a speed of 3 m/s. Determine the amount of energy dissipated in friction by the pulley.



8. (10%) Knowing that the coefficient of static friction between the tires and the road is 0.80 for the automobile shown. Assuming four-wheel drive, determine the magnitude of the maximum possible acceleration on a level road.



9. (10%) A uniform long slender rod *AB* of mass *m* is at rest on a frictionless horizontal surface when hook *C* engages a small pin at *A*. Knowing that the hook is pulled upward with a constant velocity  $v_0$ , determine the magnitude of the impulse exerted on the rod at *A*. Assume that the velocity of the hook is unchanged and that the impact is perfectly plastic.



(背面仍有題目,請繼續作答)

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10. (10%) Determine the natural period of small oscillations for the device shown.

