※ 考生請注意：本試題可使用計算機。　　請於答案卷(卡)作答，於本試題紙上作答者，不予計分。
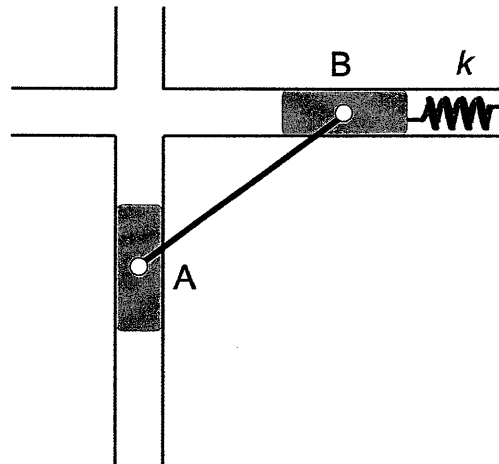
1. (25%) 請將以下中文名詞翻譯成英文：

   (1) 軸承

   (2) 螺旋彈簧

   (3) 傘齒輪

   (4) 焊接

   (5) 安全係數

   (6) 等效應力

   (7) 破壞力學

   (8) 振動

   (9) 降伏強度

  (10) 破壞理論

  (11) 應力集中

  (12) 螺栓與螺帽

2. (25%) A person of mass m_p stands at the center of an initially stationary boat of mass m_b. The boat is on water, and the length of the boat is L. Neglect the horizontal forces exerted on the boat by water. (a) If the person starts running to the right with velocity v_p relative to the water, what is the resulting velocity v_b of the boat relative to the water? (b) If the person stops when he reaches the right end of the boat, what are his position x_p and the boat's center position x_b relative to their original positions? Assume the origin of the coordinate system is at the center of the boat before the movement.

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3. (25%) The rod shown below is 5 kg in weight and 3 m in length. The sliders at the ends of the rod move in frictionless guides. The modulus of k of the spring attached to the slider at B is 600 N/m. If the system is released from rest when the rod is horizontal (the spring is compressed by 500 mm at that position), determine the angular velocity ω of the rod and the velocity v_A of end A when the stretch in the spring is zero.

4. (25%) A cart with mass m is attached to three springs and rolls on an inclined surface as shown below. The moduli of springs are k_1, k_2 and k_3. Determine the differential equation of motion for the cart using the energy method.