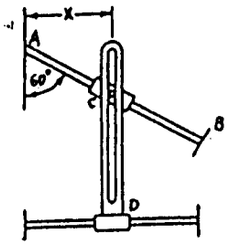
21.20.J.我 4505 4507 4501 4504 4502

國立成功大學78學年度機械工程研究所入學考試(動力學試題) 共1頁 第1頁

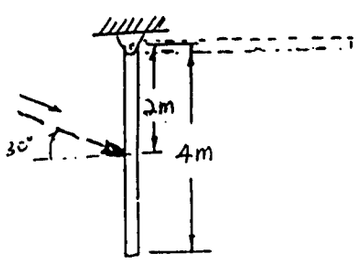
1. Collar C whose mass is 100 grams, is pulled up the frictionless fixed rod AB by the slotted frictionless guide bar D. The *horizontal* position of the collar is $x = 2t + t^3$ m where t is the time in seconds. Determine the forces transmitted by AB and guide bar D on the collar when t = 4s. (20%)

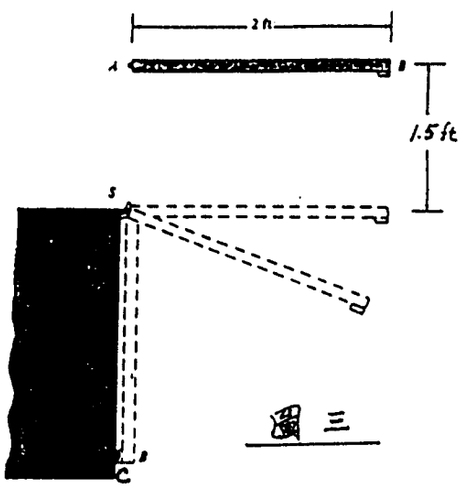


2. Explain the following terms (with their mathematical expressions, if possible):
(a) potential energy, (b) potential function,
(c) conservation of (mechanical) energy. (13%)

3. The 5-kg slender rod is released from rest when it is in the horizontal position so that it begins to rotate clockwise. A 7-g bullet having a velocity 500 m/s is fired into the rod when it is in the vertical position as shown
a) determined the total kinematic energy of the system, (18 %)
b) can you solve the problem vie principle of work and energy only ? explain it. (10 %)

4. State the principle of impulse and momentum. (5 %)





圖三

5. The uniform rod AB has a weight of 3 lb and is released from rest without rotating from the position shown. As it falls, the end A strike a hook S, which provides a permanent connection. Determine the speed at which the other end B strikes the wall at C. (17%) (見圖三)

6. The semicircular disk weighs 20 lb. Determine the period of oscillation if it is displaced a small amount and released. (17%)