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國立臺北科技大學 106 學年度碩士班招生考試

系所組別：1501 自動化科技研究所

第二節　工程力學　試題　（選考）

注意事項：

1. 本試題共 4 題，每題 25 分，共 100 分。
2. 請標明大題、子題編號作答，不必抄題。
3. 全部答案均須在答案卷之答案欄內作答，否則不予計分。

一、Determine the speed of block A in Fig. 1. Block B has an upward speed of 20 m/s. (25%)

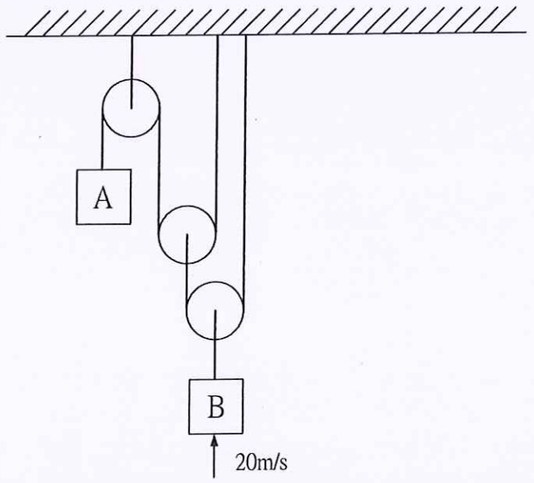

Fig. 1

二、A smooth 2-kg collar C, shown in Fig. 2, fits loosely on the vertical shaft. If the spring is upstretched when the collar is in the horizontal positon A. (the spring has a stiffness of 4N/m).

1. Determine the speed at which the collar is moving when y=1 m if it is released from rest at A. (15%)
2. Determine the speed at which the collar is moving when y=1 m if it is released at A with an upward velocity Va= 2 m/s. (10%)

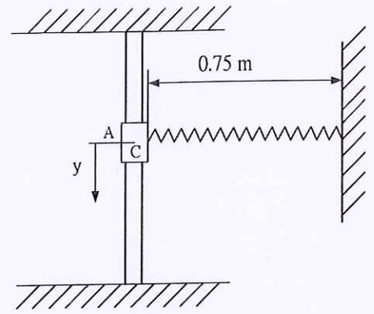

Fig. 2

三、The uniform slender pole shown in Fig.3 has a mass of 100kg and a moment of inertia $I_G = 75kg \cdot m^2$. If the coefficients of static and kinetic friction between the end of the pole and the surface are $\mu_s = 0.3$ *and* $\mu_k = 0.25$, respectively, determine the pole's angular at the instant the 400 N horizontal force is applied. The pole is originally at rest. (25%)

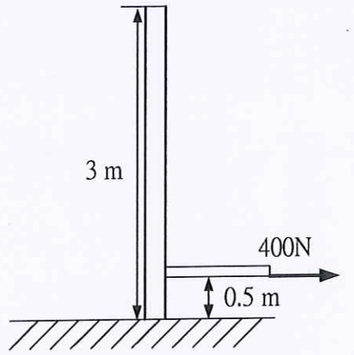

Fig. 3

四、A beam supports a distributed load as shown in Fig 4.

1. Determine the equivalent concentrated load. (Please write the location and the load.)(15%)
2. Determine the reactions at the supports.(10%)

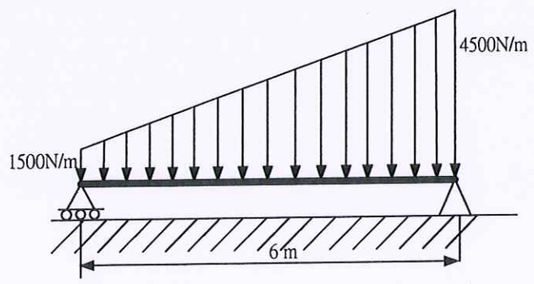

Fig. 4