國立臺北科技大學 103 學年度碩士班招生考試

系所組別：1120、1131 機電整合研究所乙、丙組

第三節　工程力學　試題（丙組選考）

注意事項：

1.本試題共 4 題，配分共 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、The two bars *AC* and *BD*, as shown in Fig. 1, are constructed from the same stock. Determine the function of the coefficient of static friction μ_s at angle θ which is about to slip. Friction at the two pins is negligible. State the value of θ for μ_s=0.50. (25%)

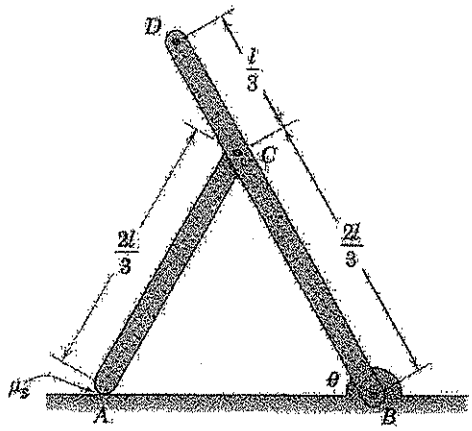

Fig. 1

二、A curved cantilever beam has the form of a quarter circular arc as shown in Fig. 2. Determine the expressions for the axial force *P*, the shear force *V* and the bending moment *M* as functions of θ. Find also maximum *M* and its associated θ. (25%)

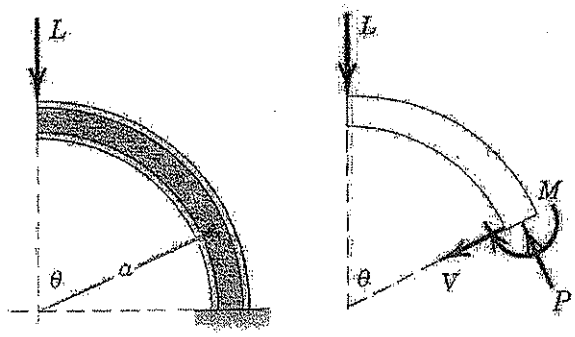

Fig. 2

三、The path of a particle P is a limacom(蚶線), as shown in Fig. 3. The motion of the particle is defined by the relations $r = b(2+\cos \pi t)$ and $\theta = \pi t$, where t and θ are expressed in seconds and radians, respectively. Determine

1. the velocity and the acceleration of the particle when t = 2s; (15%)
2. the value of θ for which the magnitude of the velocity is maximum. (10%)

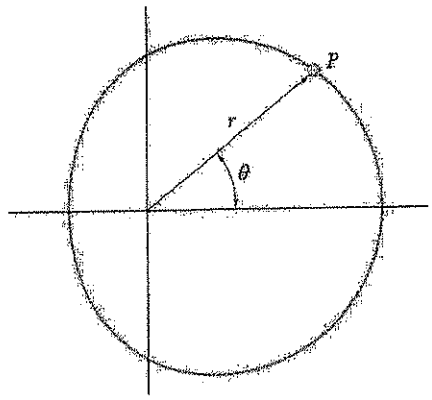

Fig. 3

四、A slender rod AB is released from rest in the position shown in Fig. 4. It swings down to a vertical position and strikes a second and identical rod CD which is resting on a frictionless surface. Assuming that the coefficient of restitution between the rods is 0.5, determine the velocity of the rod CD immediately after the impact. (25%)

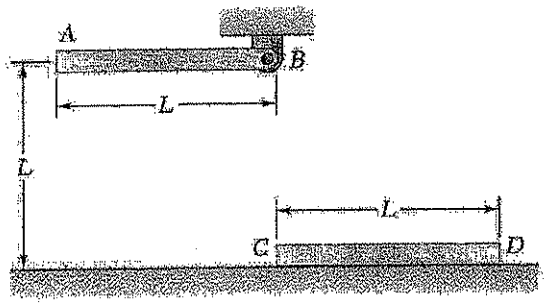

Fig. 4