

國立臺北科技大學九十九學年度碩士班招生考試

系所組別：1511 自動化科技研究所甲組

第二節 工程力學 試題 (選考)

第一頁 共二頁

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。

1. In Fig. 1, what is the moment of the force about the axis of the bar BC? (25%)

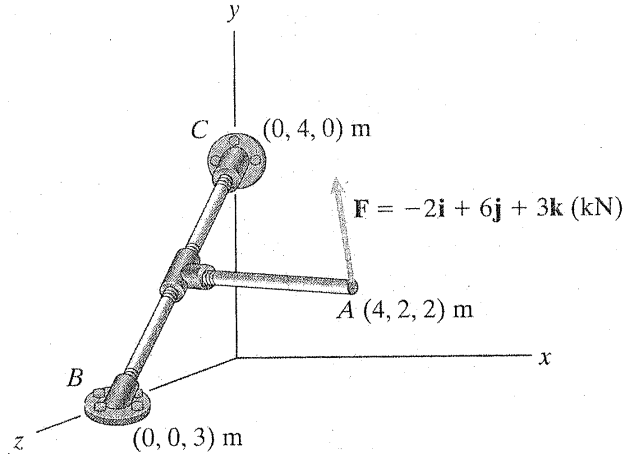


Fig. 1

2. Shown in Fig. 2, the system consists of the force and couple

$$F = 3i + 6j + 2k \text{ (N)}$$

$$M = 12i + 4j + 6k \text{ (N-m)}$$

Represent it by a **wrench** and determine where the line of action of the **wrench's** force intersects the x-z plane. (25%)

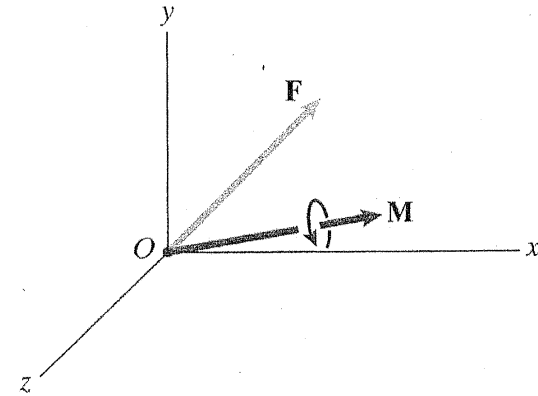


Fig. 2

注意：背面尚有試題

3. Shown in Fig. 3, the pinned bars are held in place by a linear spring. Each bar has weight W and length L . The spring is unstretched when $\alpha = 0$, and the bars are in equilibrium when $\alpha = 60^\circ$. Determine the spring constant k and determine if the equilibrium position is stable or not. (25%)

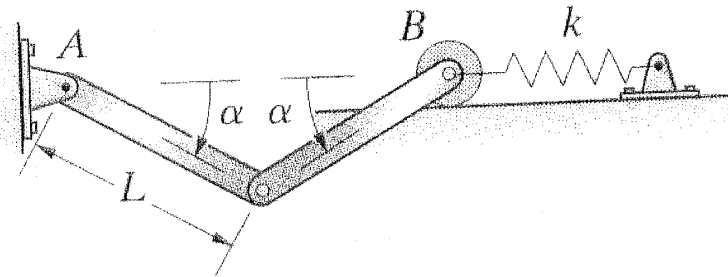


Fig. 3

4. The disk shown in Fig. 4 has a weight of 30 lb and is attached to a spring having a stiffness $k = 2 \text{ lb/ft}$ and an unstretched length of 1 ft. If the disk is released from rest in the position shown and rolls without slipping, determine its angular velocity at the instant it is displaced 3 ft. (25%)

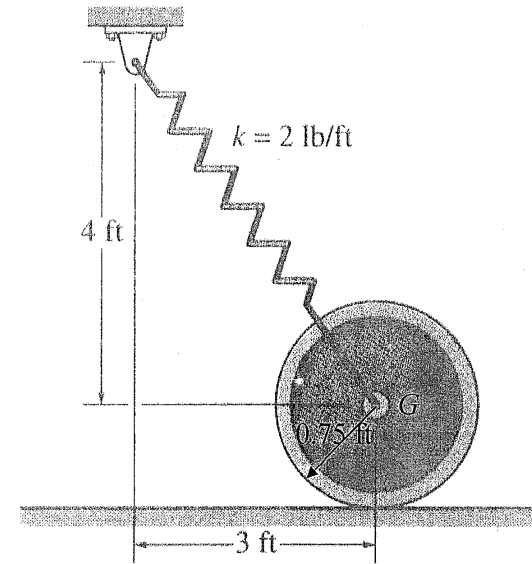


Fig. 4