淡江大學 100 學年度轉學生招生考試試題

系別：航空太空工程學系三年級　　科目：工程力學(含靜力學、動力學) 47-1

考試日期：7 月 19 日(星期二) 第 1 節　　本試題共 4 大題， 2 頁

1. The cross sectional area of the rectangular beam (*Figure* 1*a*.) and the *T* beam (*Figure* 1*b*.) is 24 cm^2, respectively. It is noted that the area moment of inertia of the rectangular area (with respect to the centroid (幾何中心) and *x*-axis (*i.e.* I_{xc})) is 72 cm^4 (*i.e.* $4(6^3)/12 = 72cm^4$). Please **locate** the centroid (*C*) of the cross-sectional area of the *T* beam, and then **find** the area moment of inertia (I_{xc}) of *T* beam as shown in *Figure* 1*b*. What will be your **comments** if compare with the answer of *Figure* 1*a* and 1*b*. ? (Note: the dimensions in *Figures* 1*a* and *b* are not in scales) (35%)　簡易中文提示(詳情請閱讀原題目)：圖1*a* 及1*b* 截面積相等，求圖1*b* 的幾何中心及其面積慣性矩(I_{xc})，並與圖1*a* 的面積慣性矩比較，且寫出你的看法。注意:圖中各標記尺寸並不一定等比例。

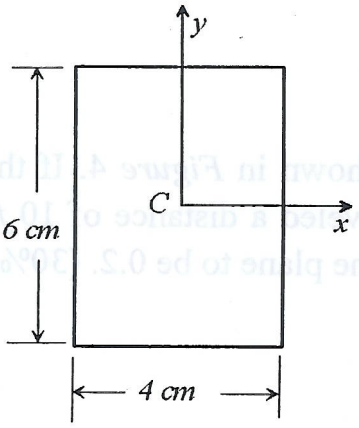

Figure 1*a*.

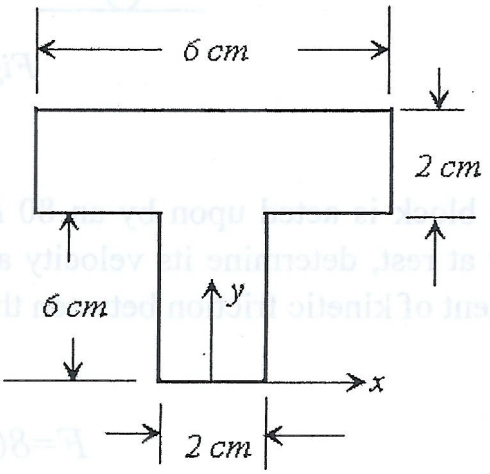

Figure 1*b*.

2. Give reasons why a zero-force member like *AE* in *Figure* 2 is still an important part of the truss even if it is not carrying any load. (15%)

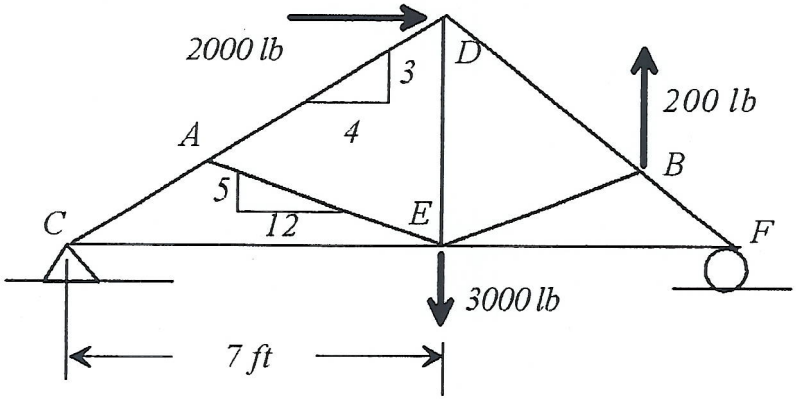

Figure 2.

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3. Rod *AB* rotates about point *A* as shown in *Figure* 3. Its motion is defined by $\theta = 4t^3$. Where θ is in radians and t is in seconds. At t = 0.5 seconds, what will be the **magnitude** of the acceleration of end *B*. (20%)

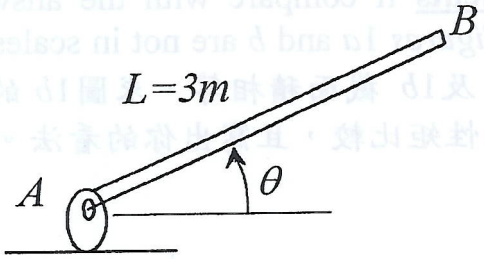

Figure 3.

4. A 50-*lb* block is acted upon by an 80 *lbs* force as shown in *Figure* 4. If the block is initially at rest, determine its velocity after it has traveled a distance of 10 *ft*. Assume coefficient of kinetic friction between the block and the plane to be 0.2. (30%)

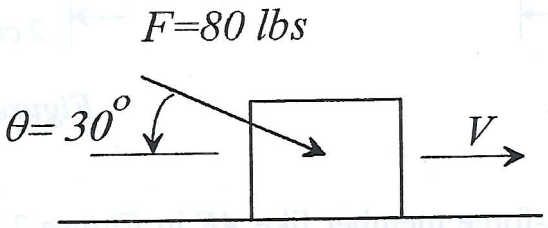

Figure 4.