編號： 75　　國立成功大學 107 學年度碩士班招生考試試題

系　　所：機械工程學系

考試科目：靜力學及專業英文　　考試日期：0205，節次：1

※ 考生請注意：本試題可使用計算機。　請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

1.專業英文

(a) 請將寫出下列縮寫(abbreviations)的完整英文 (5%)

(1) EV 電動車

(2) PM 懸浮微粒

(3) CAD 電腦輔助設計

(4) UNF thread 統一標準細螺紋

(5) ASME 美國機械工程師學會

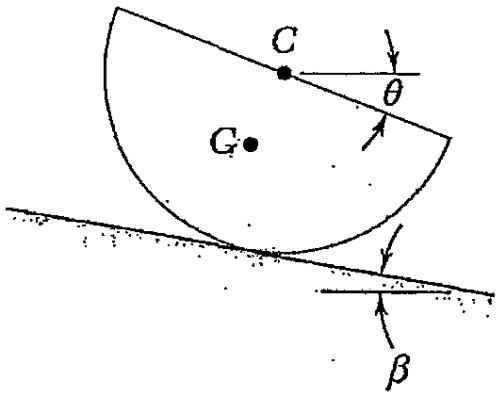
(b) 中翻英 (10%)

創客(maker)是指一群酷愛科技、熱衷實踐的人，他們以分享技術、交流想法為樂，興趣主要集中在以工程化為導向的主題上，例如電子、機械、機器人、三維列印等，但也不限於此，整合來自不同知識領域的創意是他們的長處，善於挖掘新技術、鼓勵創新與原型化，不單有想法，還有成型的作品。他們注重在實踐中學習新東西，從想到做的展現則成為影響未來競爭力的關鍵。

(c) 英翻中 (10%)

The involute gear profile is the most commonly used system for gearing today, with cycloid gearing still used for some specialties such as clocks. An important advantage of the involute form over all others is that it provides theoretical prefect conjugate action even when the shaft center distance are not exact correct. Interference will occur if the addendum of gear or pinion extends beyond the involute tooth profile.

2. A homogeneous hemisphere of radius r is places on an incline as shown. C is the center of this hemisphere and G is the center of gravity. (a) Show that the distance between C and G is 3r/8. (b) Assuming that friction is sufficient to prevent slipping between the hemisphere and the incline. Determine the largest angle β for which a position of equilibrium exists. (c) Also find the angle θ corresponding to equilibrium when the angle β is equal to one-third that value found in (b) (25%)



3. The Figure P3 shows a bevel gear attached to a shaft supported by self-aligning bearings at A and B. Gear loads in the plane of the paper are shown (the tangential or torque-producing component is perpendicular to the paper). Only bearing A takes thrust. Dimensions are in millimeters.

(a) (10%) Find the reaction forces in bearings A and B.

(b) (15%) To what values of axial load and torque is the shaft subjected, and what portion(s) of the shaft experience these loads?

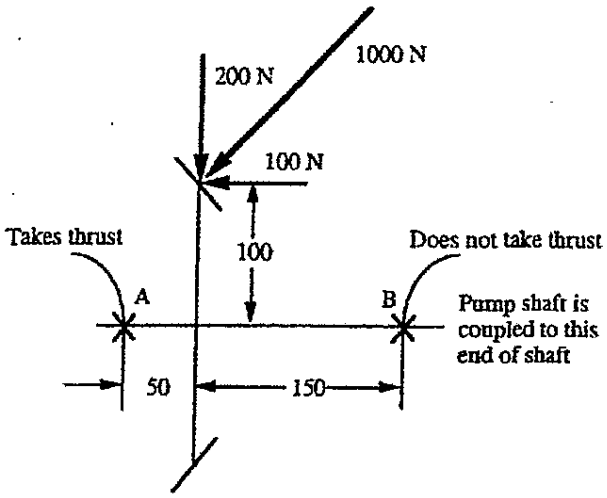


Figure P3.

4. A square-thread screw jack is used to raise a load of F. The static friction and the lead angle of the thread are μ and λ, respectively.

(a) Show that for zero collar friction the efficiency is given by the equation

efficiency=tanλ[(1-μtanλ)/(tanλ+μ)]. (9%)

(b) Show that in what condition does the system self-lock. A self-locking screw is one that requires a positive torque to lower the load. (8%)

(c) Find the maximal efficiency and the corresponding λ, use μ=0.08. (8%)