

淡江大學九十四學年度碩士班招生考試試題 153

系別：運輸管理學系

科目：力學（動力學及靜力學）

准帶項目請打「V」	
<input checked="" type="checkbox"/>	簡單型計算機

本試題共 2 頁 P.1

本試題雙面印製

- (15%) The arrangement in Figure 1 exerts a horizontal force on the stationary crate. The crate weighs 800N, and the coefficient of the static friction between the crate and the ramp is $\mu_s = 0.4$.
 - If the rope exerts a 400-N force on the crate, what is the friction force exerted on the crate by the ramp.
 - What is the largest force the rope can exert on the crate without causing it to slide up the ramp.

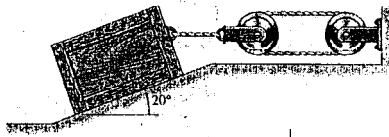


Figure 1

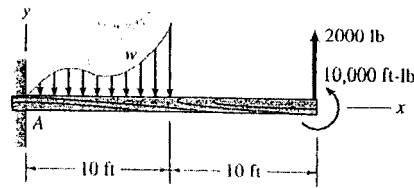


Figure 2

- (15%) The beam in Figure 2 is subjected to a distributed load, a force and a couple. The distributed load is $w = 300x - 50x^2 + 0.3x^4$ lb/ft. Determine the reactions at A.
- (15%) Determine the moments of the inertia and radii of gyration of the circular area in Figure 3.

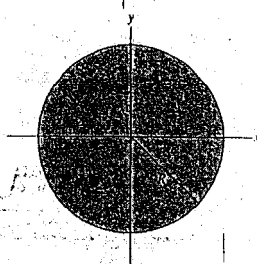


Figure 3

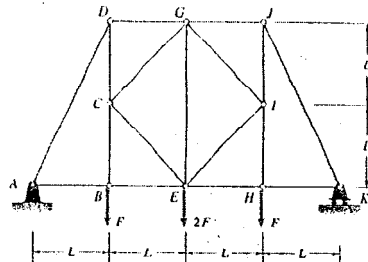


Figure 4

- (10%) Determine the axial force in members DG and BE of the truss in Figure 4.

◀ 注意背面尚有試題 ▶

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✓	簡單型計算機

5. (10%) A 10-kg uniform cylinder 150 mm in diameter rolls down an incline as shown in Figure 5. If the cylinder is released from rest and rolls without slipping, determine the initial angular acceleration of the cylinder.

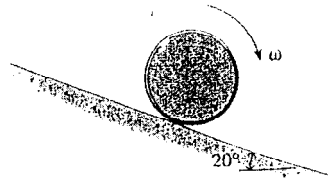


Figure 5

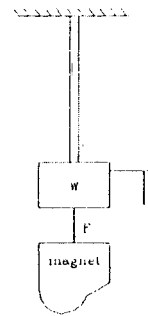


Figure 6

6. (10%) A uniform vertical elastic rod with cross sectional area A and modulus of elasticity E is fastened at its upper end. As shown in Figure 6, the rod carries a weight W , and a magnet pull on the weights with a force F , given by $F=C(a-e)^2$ where C and a are constants and e is the extension of the rod. Find the total potential energy of the system.
7. (15%) A rocket transports a satellite to a point 800km above the earth's surface (Figure 7). Determine the velocity (parallel to the earth's surface) required to place the satellite in an elliptical orbit with a maximum altitude of 8000km.

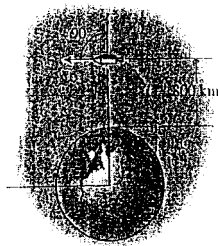


Figure 7

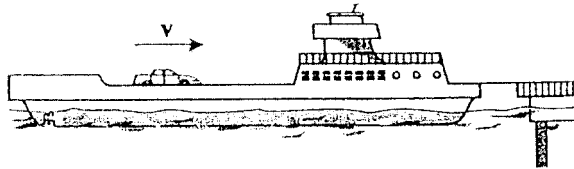


Figure 8

8. (10%) A 2500-lb car is initially at rest on the deck of a ferry, which is tied to a dock as shown in Figure 8. The ferry weighs 25000lb. If the car accelerates uniformly from rest to 20 mi/h in 4 seconds, determine the average tension in the cable during this time.