

國立中山大學 113 學年度 碩士班暨碩士在職專班招生考試試題

科目名稱：靜力學【機電系碩士班丁組】

— 作答注意事項 —

考試時間：100 分鐘

- 考試開始鈴響前不得翻閱試題，並不得書寫、劃記、作答。請先檢查答案卷（卡）之應考證號碼、桌角號碼、應試科目是否正確，如有不同立即請監試人員處理。
- 答案卷限用藍、黑色筆(含鉛筆)書寫、繪圖或標示，可攜帶橡皮擦、無色透明無文字墊板、尺規、修正液（帶）、手錶(未附計算器者)。每人每節限使用一份答案卷，請衡酌作答。
- 答案卡請以 2B 鉛筆劃記，不可使用修正液（帶）塗改，未使用 2B 鉛筆、劃記太輕或污損致光學閱讀機無法辨識答案者，後果由考生自負。
- 答案卷（卡）應保持清潔完整，不得折疊、破壞或塗改應考證號碼及條碼，亦不得書寫考生姓名、應考證號碼或與答案無關之任何文字或符號。
- 可否使用計算機請依試題資訊內標註為準，如「可以」使用，廠牌、功能不拘，唯不得攜帶書籍、紙張（應考證不得做計算紙書寫）、具有通訊、記憶、傳輸或收發等功能之相關電子產品或其他有礙試場安寧、考試公平之各類器材入場。
- 試題及答案卷（卡）請務必繳回，未繳回者該科成績以零分計算。
- 試題採雙面列印，考生應注意試題頁數確實作答。
- 違規者依本校招生考試試場規則及違規處理辦法處理。

國立中山大學 113 學年度碩士班暨碩士在職專班招生考試試題

科目名稱：靜力學【機電系碩士班丁組】

題號：438004

※本科目依簡章規定「可以」使用計算機（廠牌、功能不拘）（問答申論題）

共 3 頁第 1 頁

1. Please determine the magnitude ϕ in Fig 1? (10%)
2. Calculate the required tension in cables BA and BC to support the 60-kg cylinder shown in Figure 2. (10%)
3. If the angle θ is 45 degrees, calculate the moment generated by the 4-kN force around point A as depicted in Figure 3. (8%)
4. Calculate the reaction forces acting on the smooth, uniform bar with a mass of 20 kg, as shown in Figure 4. (8%)
5. In Figure 5, the cart is holding a uniform crate with a mass of 85 kg. Calculate the vertical reaction forces at the three casters located at points A, B, and C. Note that the caster at B is not visible in the figure. Assume the mass of the cart itself is negligible. (8%)
6. Calculate the forces exerted by the pins at points A and B on the two-member frame as depicted in Figure 6. (8%)
7. Calculate the moment at point F on the beam as shown in Figure 7. (8%)
8. In Figure 8, a 45-kg disk is placed on a surface with a static friction coefficient of $\mu_A=0.2$. Calculate the maximum couple moment M that can be applied to the bar without initiating motion. (8%)
9. Determine the location of the centroid for the plate area depicted in Figure 9. (8%)
10. Calculate the moment of inertia around the x-axis as shown in Figure 10. (8%)
11. Calculate the moment of inertia of the equilateral triangle around the x' axis that passes through its centroid, as depicted in Figure 11. (8%)
12. Determine the coordinates \bar{x} and \bar{y} for the centroid C of the beam's cross-sectional area shown in Figure 12, and then calculate the product of inertia with respect to the x' and y' axes. (8%)

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共 3 頁第 2 頁

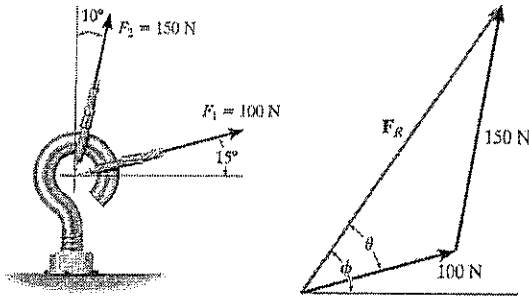


Fig. 1

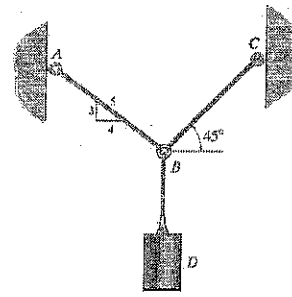


Fig. 2

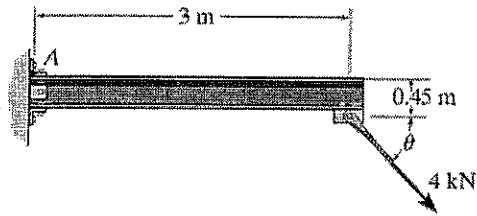


Fig. 3

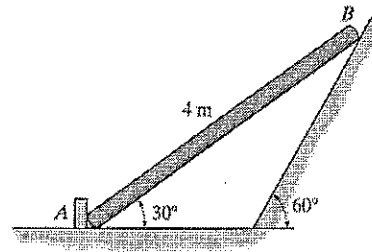


Fig. 4

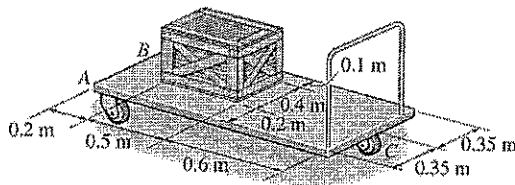


Fig. 5

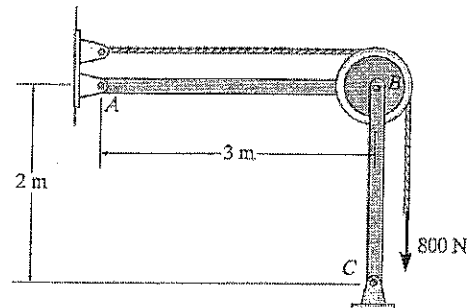


Fig. 6

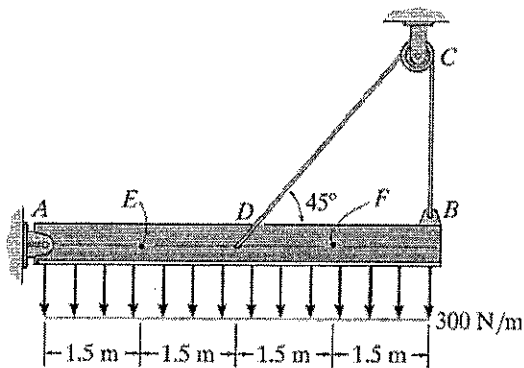


Fig. 7

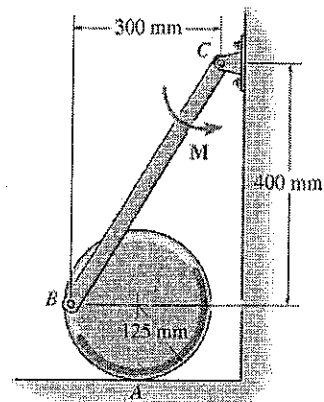


Fig. 8

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共 3 頁第 3 頁

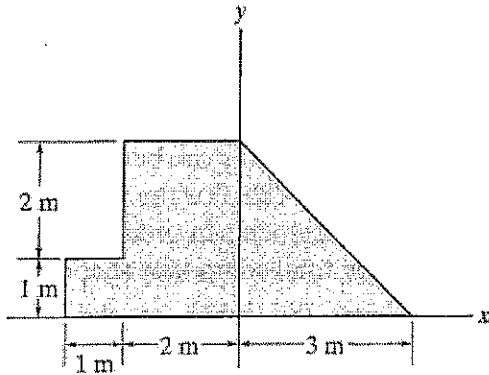


Fig. 9

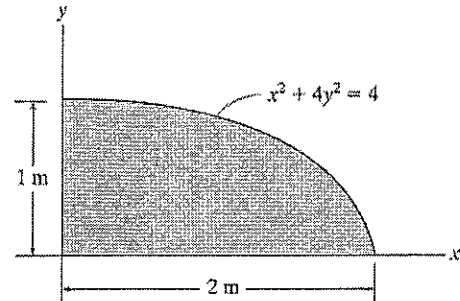


Fig. 10

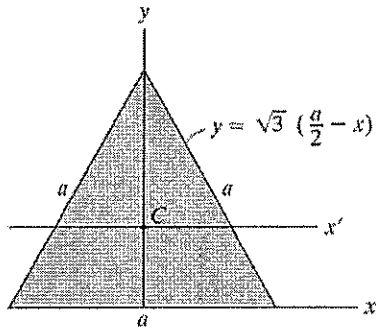


Fig. 11

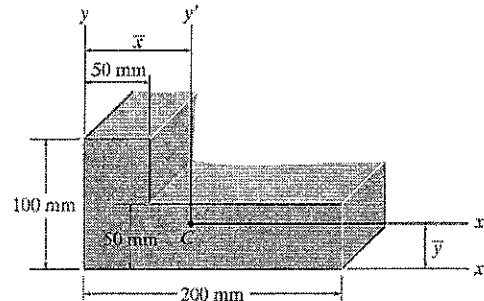


Fig. 12