

# 國立臺北科技大學 109 學年度碩士班招生考試

系所組別：1203 製造科技研究所

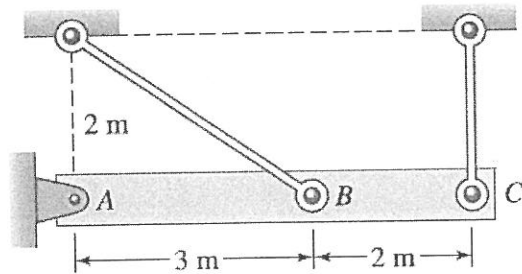
第一節 材料力學 試題 (選考)

第 1 頁 共 1 頁

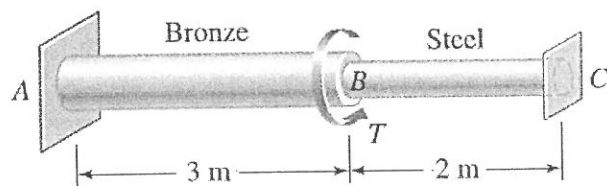
**注意事項：**

1. 本試題共 4 大題，部分大題各有 2 至 3 小題不等，其配分如各題題末括註所示，共 100 分。
2. 不必抄題，作答時請將試題題號及答案依照順序寫在答案卷上。
3. 全部答案均須在答案卷之答案欄內作答，否則不予計分。

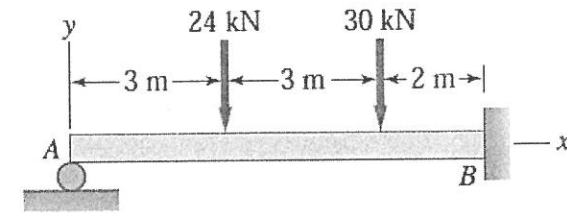
1. The uniform rigid bar  $ABC$  of weight  $W$  is supported by rods that are identical except for their lengths. Assuming that the bar was held in the horizontal position when the rod was attached, determine the force in each rod after the attachment. (20%)



2. The ends of compound shaft are attached to rigid walls. The maximum shear stress is limited to 60 MPa for the bronze segment  $AB$  and 84 MPa for the steel segment  $BC$ . The shear moduli are 35 GPa for bronze and 80 GPa for steel. Determine the diameter of each segment so that each material is simultaneously stressed to its permissible limit when the torque  $T=40 \text{ kN}\cdot\text{m}$  is applied as shown. (20%)



3. For the propped cantilever beam,  
 (1) determine all the support reactions, and (18%)  
 (2) draw the shear force and bending moment diagrams. (12%)



4. The state of plane stress at a point is shown with respect to the  $xy$ -axes.  
 (1) Determine the principal stresses and the principal directions. Show the results on a sketch of an element aligned with the principal directions. (18%)  
 (2) Determine the maximum in-plane shear stress. Show the results on a sketch of an element aligned with the planes of maximum in-plane shear stress. (12%)

