

國立臺北科技大學九十六學年度碩士班招生考試

系所組別：3110 土木與防災研究所甲組

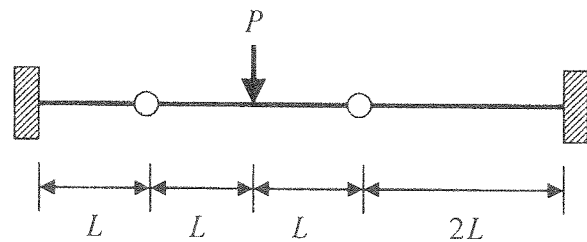
第一節 材料力學 試題

第一頁 共一頁

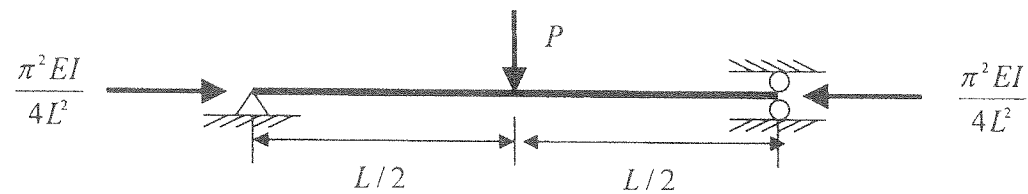
注意事項：

1. 本試題共四題，配分共 100 分。
2. 請標明大題、子題編號作答，不必抄題。
3. 全部答案均須在答案卷之答案欄內作答，否則不予計分。

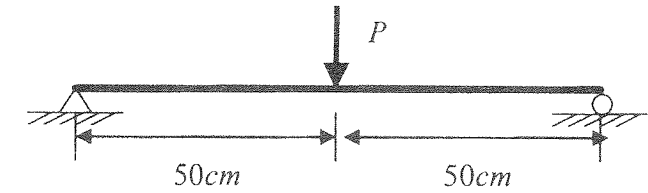
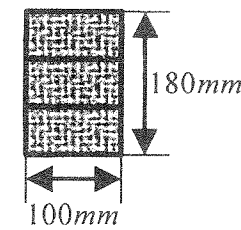
1. The beam shown below has fixed supports at two ends and is made up of three members that are pinned together. Find the deflection under the load. The flexural rigidity for each member is assumed to be a constant of EI . 【25】



2. The deflection at the center of a simply supported beam of linearly elastic material with a concentrated load P in the middle of the span is known to be $PL^3/48EI$. Find the deflection at the middle span with that which would result if an axial force of $\pi^2 EI/4L^2$ also acts on the beam. Find your solution by solving a differential equation. 【25】

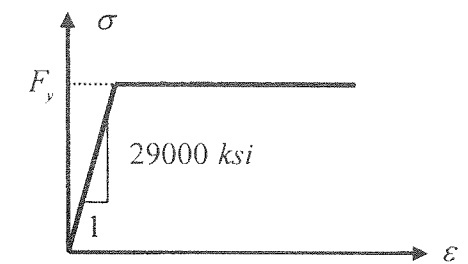
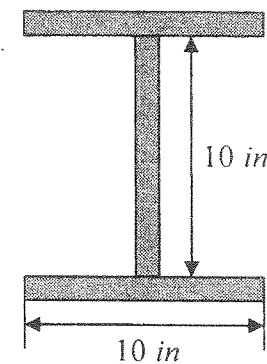


3. A laminated beam is built up by gluing together three $60\text{ mm} \times 100\text{ mm}$ boards to form a solid beam $100\text{ mm} \times 180\text{ mm}$ in cross section as shown below. The allowable shear stress in the glued joints is 0.4 N/mm^2 . If the simple supported beam has a length of 100 cm , what is the allowable load at the middle of the beam? 【15】 What is the corresponding maximum bending stress. 【10】



4. For the cross section shown below.
- (a) Determine the yielding moment. 【10】
 - (b) Determine the plastic moment. 【10】
 - (c) The cross section is loaded with a moment of 415 kip-ft acting upon the principal axis and then unloaded. Compute the residual stress distribution on the cross section after unloading. 【5】.

The thickness for the two wide flanges and web is 1 in . In addition, the yielding stress for the two wide flanges is $F_y = 60\text{ ksi}$ and that for the web is $F_y = 36\text{ ksi}$



Stress-strain relationship for steel