

國立成功大學

113學年度碩士班招生考試試題

編 號： 101

系 所： 土木工程學系

科 目： 材料力學

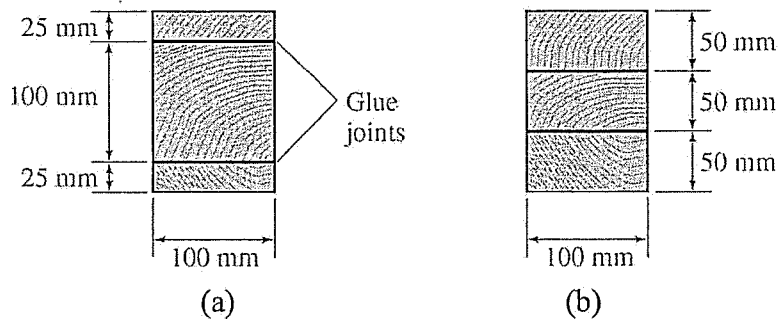
日 期： 0201

節 次： 第 1 節

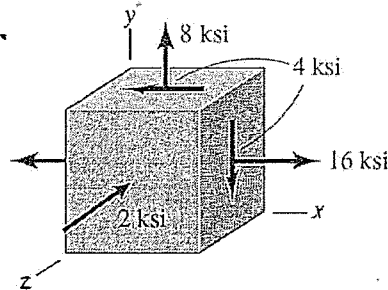
備 註： 可使用計算機

※ 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. A 50-mm-diameter solid shaft is made of elastic, perfectly plastic material and is subjected to a torque $T = 4.0 \text{ kN m}$. Determine the angle of twist (ϕ) of this 4-m-long shaft if the yielding shear stress (τ_y) is 124 MPa and the yielding shear strain (γ_y) is 0.0016 rad. (25%)
2. On the basis of the bending moment and shear strength of the beams, which one of the two glulam beams (*a* or *b*) would you choose? How much stronger (in shear) is it than its competitor? The allowable bending stress σ and transverse shear stress τ are the same for both beam *a* and beam *b*. There is no slip at glue joints. (25%)



3. Determine the absolute maximum and minimum shear stress for the given stress states. (25%)



4. Derive the buckling equation for this non-sideway column with a rotational spring attached at support *B*. The coefficient of the rotational stiffness is β_R . (25%)

