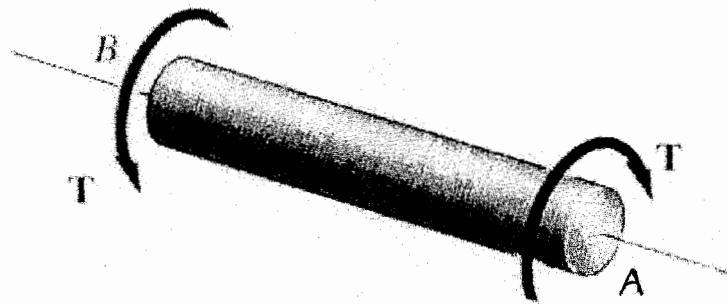※ 考生請注意：本試題不可使用計算機。　請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

1. (10pts) How to describe the components of stress of a point in a body which is subjected to most general loading conditions.

2. (10pts) Show that the angle of twist ϕ is equal to TL/JG, where T is the applied torque, L is the length of the shaft, J is the polar moment of inertia and G is the shear modulus.


3. (20pts) Two aluminum strips are securely bonded to a brass bar of 30×30 mm square cross section. Using the data given below, determine the largest permissible bending moment when the composite member is bent about a horizontal axis.
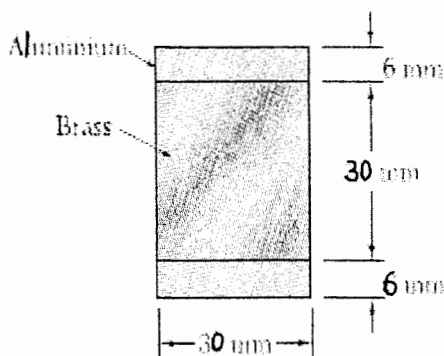
	Aluminium	Brass
Modulus of elasticity:	70 GPa	105 GPa
Allowable stress:	100 MPa	160 MPa

4. (20pts) For the beam and loading shown, design the cross section of the beam, knowing that the grade of timber used has an allowable normal stress of 12 MPa.
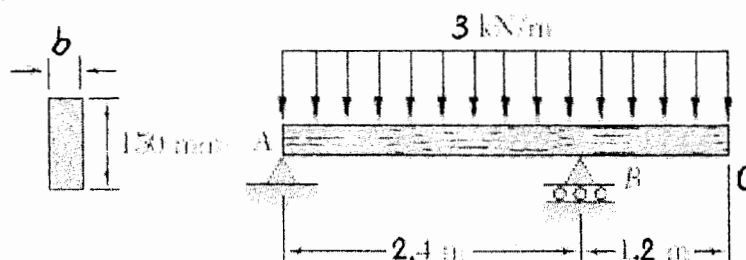

(背面仍有題目，請繼續作答)

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5. (20pts) A single strain gage forming an angle $\beta = 30°$ with the vertical is used to determine the gage pressure in the cylindrical steel tank shown. The cylindrical wall of the tank is 10 mm thick, has a 900 mm inner diameter, and is made of a steel with $E = 200$ GPa and $\nu = 0.30$. Determine the pressure in the tank corresponding to a gage reading 220×10^{-6} mm/mm. ($\sin 60° = 0.866$)
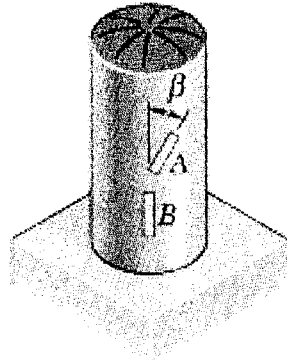
6. (20pts) For the beam and loading shown, determine the reaction at the roller support.

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