考試科目：工程力學

系所名稱：系統工程暨造船學系碩士班不分組

＊可使用計算器

1. 答案以橫式由左至右書寫。2. 請依題號順序作答。

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1. Explain the following terminologies in DETAIL: (15%)
   (a) Moment of inertia
   (b) Principal stress
   (c) Indeterminate structure

2. Draw the shear-force diagram, bending-moment diagram and find the displacement at the midpoint of the beam shown in the figure. (25%)
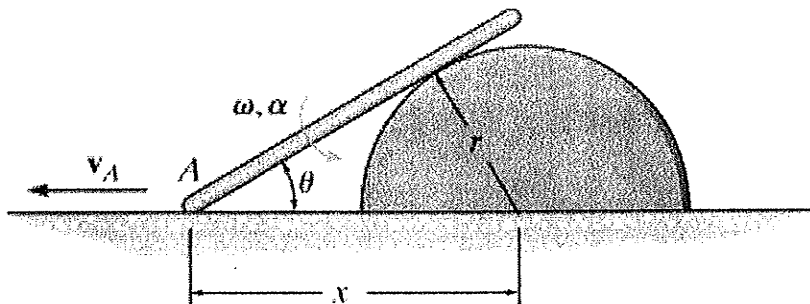
   The beam has section W410x85 with $A=10800mm^2$, $I=315\times10^6 mm^4$, E=200 GPa
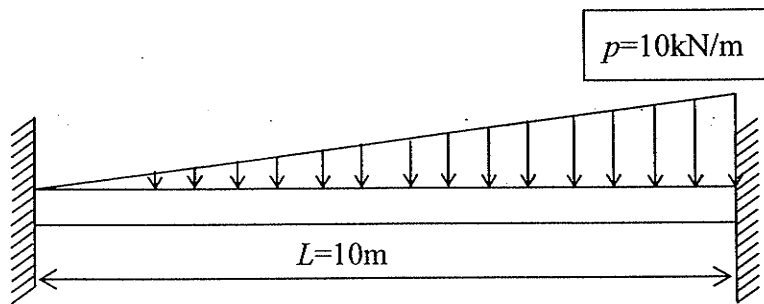
3. [20%] End A of the bar moves to the left with a constant velocity v_A. Determine the angular velocity ω and angular acceleration α of the bar as a function of its position x.
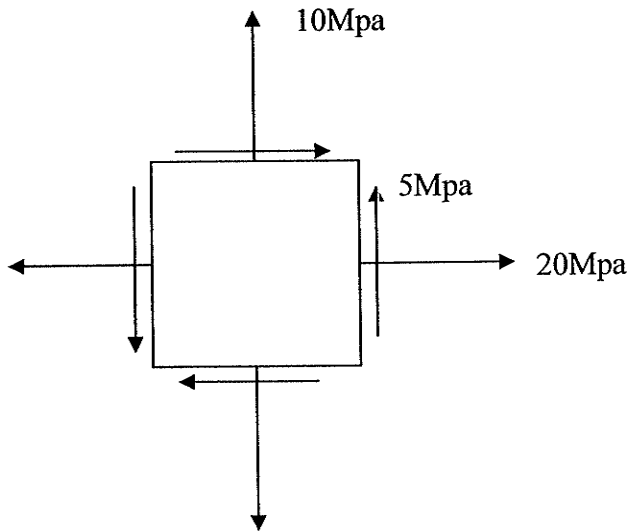   Hint: find the relation between x and r

4. [20%] Draw the Mohr's Circle associated with the following stress element. Find and sketch the stress elements that represent the direction and magnitude of (a) principal stress, (b) maximum shear stress

The detail calculation is required

5. [20%] Find the location of neutral axis (x-x) and area moment of inertia (I_{xx}) of the following cross section