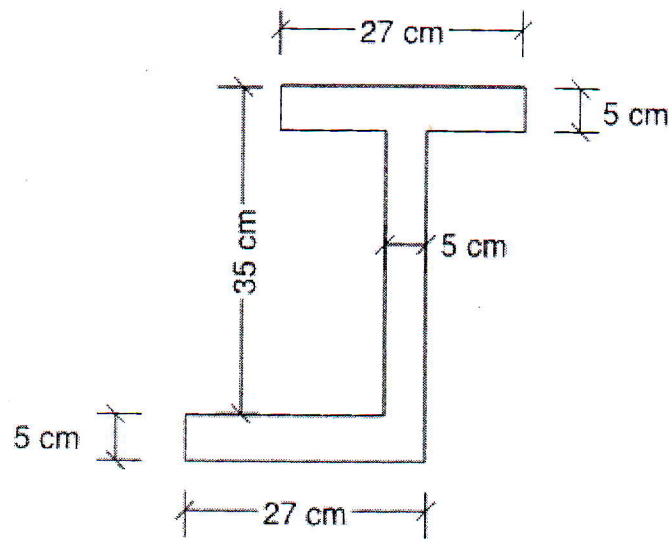


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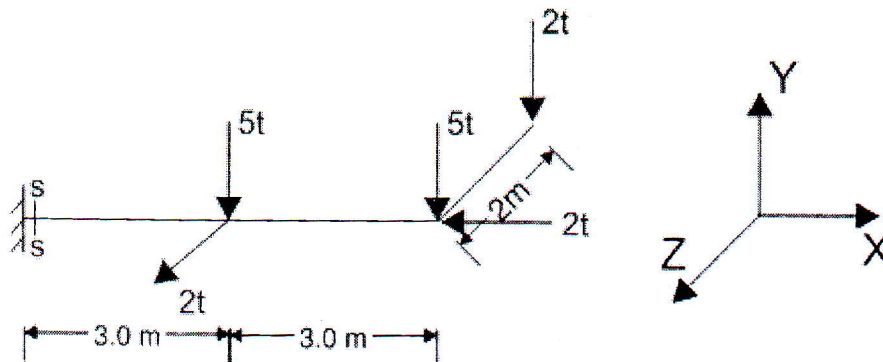
**Problem 1: (20 points)**

For the section shown, Determine the Center of gravity, the principal centroidal moments of inertia ( $I_{max}$ ), ( $I_{min}$ ) and angle of rotation of the principal axes.



**Problem 2 : (20 points)**

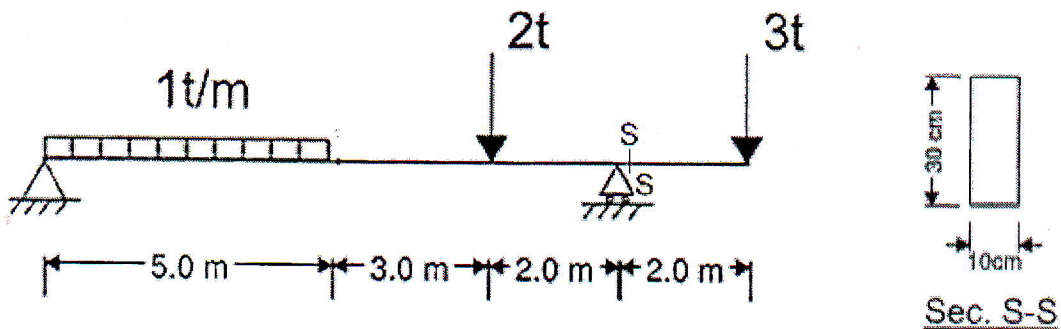
For the beam shown in Figure (3), Determine the straining Actions  $N$ ,  $Q_y$ ,  $Q_z$ ,  $M_x$ ,  $M_y$ , and  $M_z$  at section s-s.





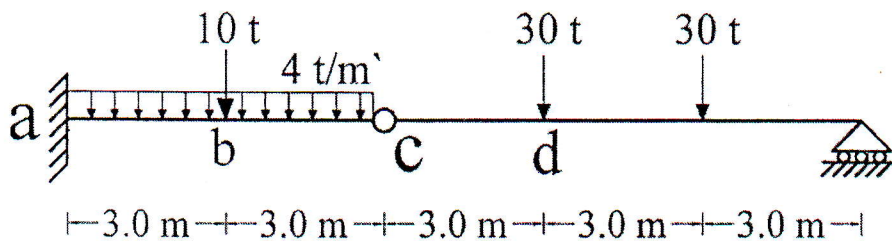
**Problem 3: (20 points)**

For the beam and its cross section shown, Draw the normal stress distribution and shear stresses distribution at section s-s.



**Problem 4 : (20 points)**

For the beam shown, Determine the deflection and slope angle at points (a,b,d ) and change in slope at point (c) using the conjugate beam method ( $EI= 5000 \text{ t.m}^2$ )



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Arch. Engineering Dept.

Second Year Arch.



Theory of Structures II-CVE227

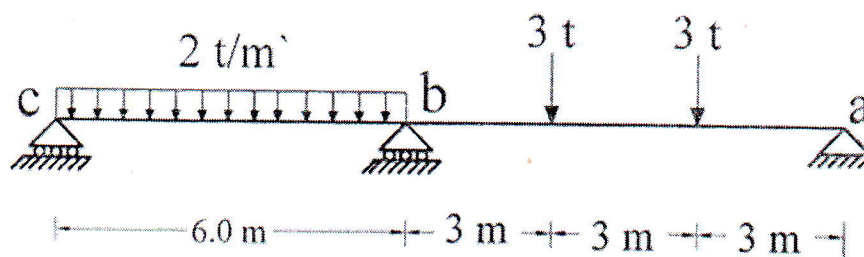
Final Exam 2015/2016

Time allowed: 3 Hrs

Total Points: 100 points

**Problem 5 : (20 points)**

Solve the beam shown using Three-moment equation method and draw the (S.F.D) and (B.M.D) [ $EI = \text{Const.}$ ]



*Good Luck*

*Dr. Alaa Kadib*

*Dr. Ahmed Nasr*