

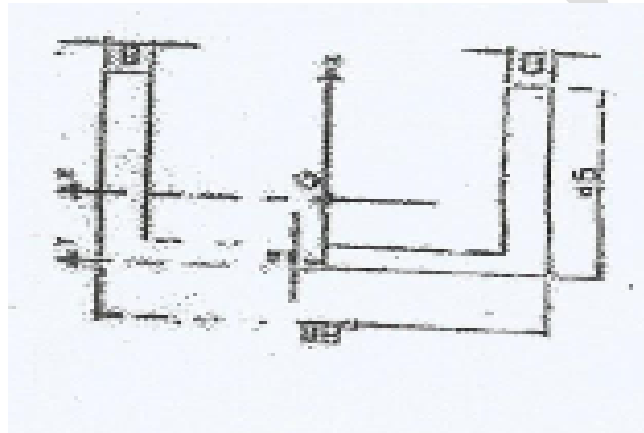
COMPETITIVE ENTRANCE EXAMINATION INTO H. T. T. C.**BAMBILI BAMENDA 2011 SESSION**

Paper 1 (Major), for Mechanical Design, Mechanical Manufacturing and Automobile mechanics

APPLIED MECHANICS FOR BAC F1, BT, MF/CM (CH), BT MA

DURATION: 3hrs. Coefficient 4

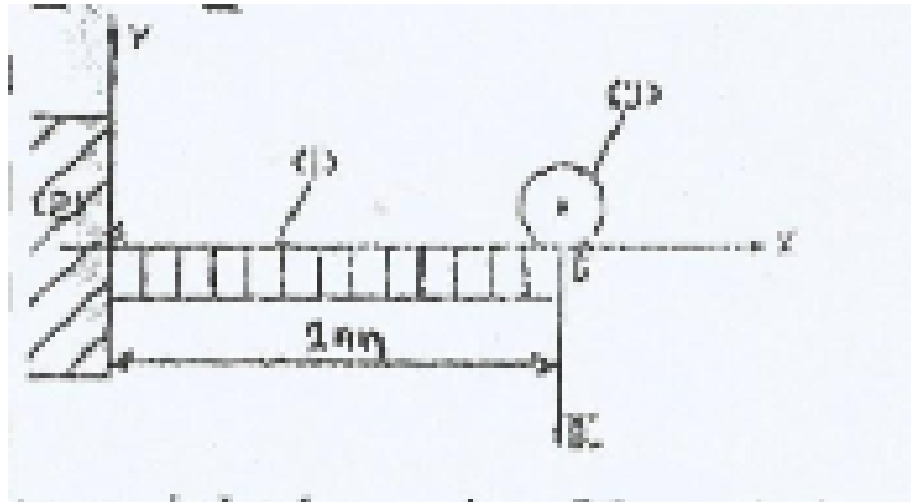
Exercise 1: A section in U has the section defined below.



Questions:

- 1) Calculate the Y_g position and Z_g of the gravity center G .
- 2) Calculate the quadratic moment I_{gx} , I_{gy} and I_{gz} .

Exercise 2: A beam (1) is imbedded in A in a concrete (2)



This beam is heavy and its weight by unit of length is $P = 600\text{N/m}$. Besides, it supports a hoist and the load that is suspended have total mass of 100Kg . The survey in bending in (1) will make itself in the most unfavorable case, that means when (3) is in the B extremity of the beam (1) (Take $g = 10\text{m/s}^2$).

Questions:

- 1) Considering the equilibrium of the beam(1), represent the outside action that contribute to this equilibrium and calculate the action of (2) on (1) in A.
- 2) Construct along (1) the diagram of the effort deciding T_y of the bending moment M_{jz} .
- 3) Calculate the maximum value of $|M_{zf}|$ and determine the cross section.