Ministry of Higher Education
Giza Higher Institute for Eng. & Tech.
Civil Engineering Department
Course Name: **Theory of Structures (2)**
Course Code : **CIV 202**

Academic Year : **2016-2017**
Semester : **Second**
Level : **2nd**
Time : **1½ Hours**
Date : **25 / 3 / 2017**
Examiner: ***Dr. M. Abdel-Kader***

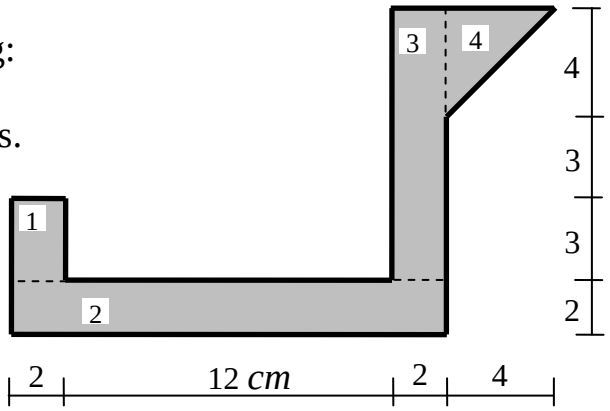
Mid-Term Exam

- The Exam consists of **2** questions in **1** page.

Question (1): (10 Marks)

For the shown cross-section, determine the following:

(a) The location of the centroid.
(b) The moments of inertia about the centroidal axes.
(c) The direction of the principal axes.
(d) The principal moments of inertia.
(e) The polar moment of inertia.
(f) The radius of gyration about the centroidal *x*-axis.



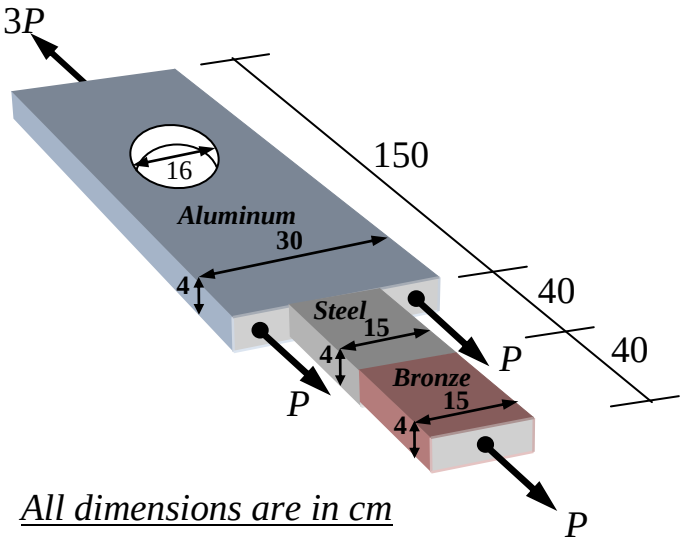
Question (2): (10 Marks)

A bar of variable cross-section is subjected to axial loads as shown**.**

(a) Determine the maximum safe value of ***P***.
(b) Determine the deformation of the **Bronze** part **only** due to ***P*** calculated in (a).

Given Data:

Allowable stress for bronze = 100 *MPa*
Allowable stress for steel = 140 *MPa*
Allowable stress for aluminum = 90 *MPa*
E =11.2 *GPa*



All dimensions are in cm

With my best wishes
Dr. M. Abdel-Kader