

Ministry of Higher Education Giza Higher Institute of Engineering & Technology Civil Engineering Department Course Name: Theory of Structures (1)B Course Code : CIV 121 Date : 17/3/2018 Academic Year : 2017/2018 Semester : Second Level : 1<sup>st</sup> Civil Time : 1 Hour Examiner: Dr. Maha Nazeef Dr. M. Abdel-Kader

#### Mid-Term Exam

Total Marks: 30 Student Name No. of Questions:2 (Attempt all questions)

Student Name:	Code:	
Question (1): (15 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		$\begin{bmatrix} 1 \\ 2 \\ 2 \end{bmatrix} = \begin{bmatrix} 24 \\ 12 \\ 24 \end{bmatrix}$
(a) The principal moments of mortid.		12 30 cm 12

# **Solution:**

Please turn over

### Question (2): (15 Marks)

A bar of variable cross-section is subjected 40to axial loads as shown. (a) Determine the maximum safe value of  $P_{Safe}$ . (b) Determine the deformation of the **Bronze** 

part **only** due to  $P_{Safe}$  calculated in (a)

# Given Data:

Allowable stress for bronze = 100 MPaAllowable stress for aluminum = 90 MPaE = 2.58 GPa

### **Solution:**

