Menoufia University **Faculty of Engineering, Shebin El-Kom** **Civil Eng. Department** **Second Semester Examination, 2013-2014** **Date of Exam: 31/ 5 / 2014**	**Subject: Reinforced Concrete** **Code: CVE 302** **Year : 3rd Year Civil** **Time Allowed : 4 hours** **Total Marks : 120 marks**

- Any data not given is to be assumed

Question 1 (60%) :

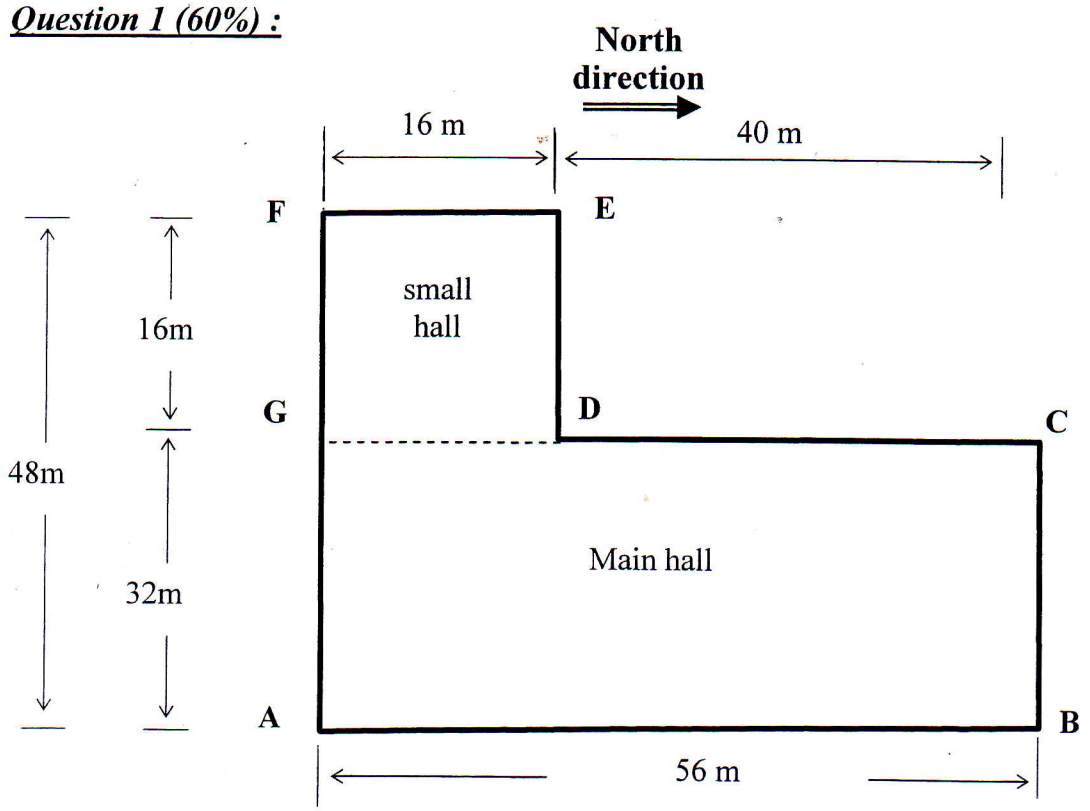

Figure (1) : Plan

The factory on area (**ABCDEFG**) shown in Fig. (1) consists of two halls. It is required to cover the industrial area (**ABCDG**) by a convenient saw-tooth system with the shown north direction and the small hall (**GDEF**) with panelled beam system. Dimensions are shown in the figure. Columns are allowed only at exterior perimeter with spacing = 8m. No intermediate columns are allowed. The clear height of the structure is 6 m.

It is required to make complete design* for the following:

1- The intermediate main system chosen for main hall (ABCDG) (20%)
2- Hollow block slab to cover the main hall sawtooth system. (10%)
3- The panelled beam system for the small hall (DEFG) (20%)
4- The frame at (DG) (10%)

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* Complete Design = Design + Drawing.

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Question 2 (30 %):

Figure (2) shows a general layout of a reinforced concrete flat slab floor of RC multistory system. The slab thickness is the minimum allowed at maximum positive moment, drop panel and or column head can be used where ever needed. Columns are 80 x 80 cm It is required to:

1- Design and draw all details of reinforcement for flat slab.
2- Design and draw all details of reinforcement for beam B1.
3- Calculate the transfer moment for columns (C1, and C2).

Assume that: The strength of concrete f_{cu}= 350 kg/cm^2.
Reinforcing steel is 36/52 ,
Live Load = 500 kg/m^2.
Floor Cover = 150 kg/m^2.
Walls = 250 kg/m^2.

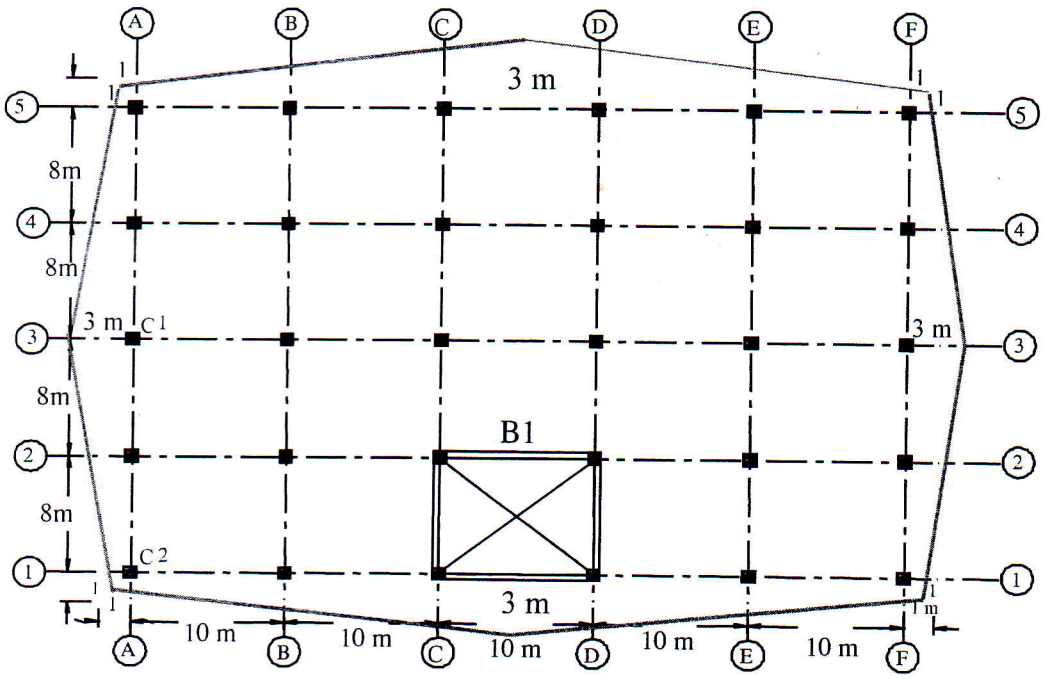

Figure (2)

Question 3 (15%):

For the shown stair, columns are allowed at the intersection of axes only. Choose an appropriate structural system for the stair, and design all structural elements of the stair showing all necessary details.

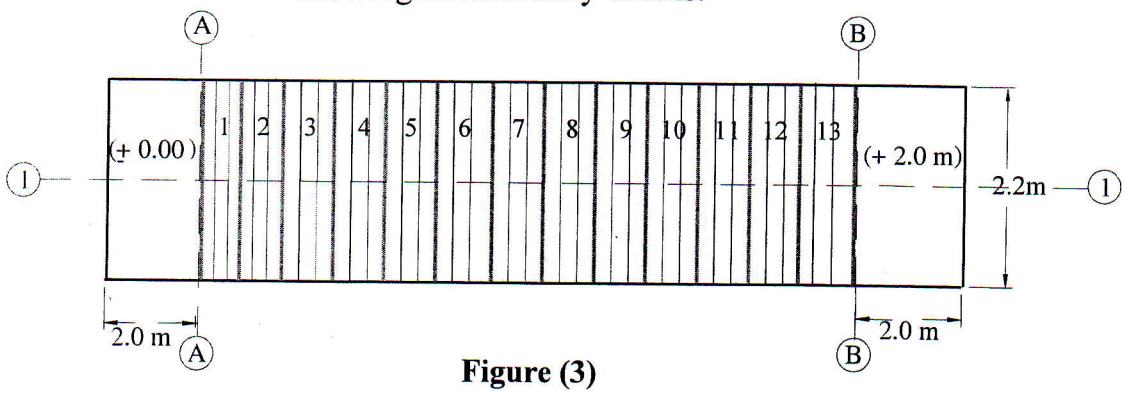

Figure (3)