



- Any data not given can be reasonably assumed.

Question 1 (60 % of max credit) :

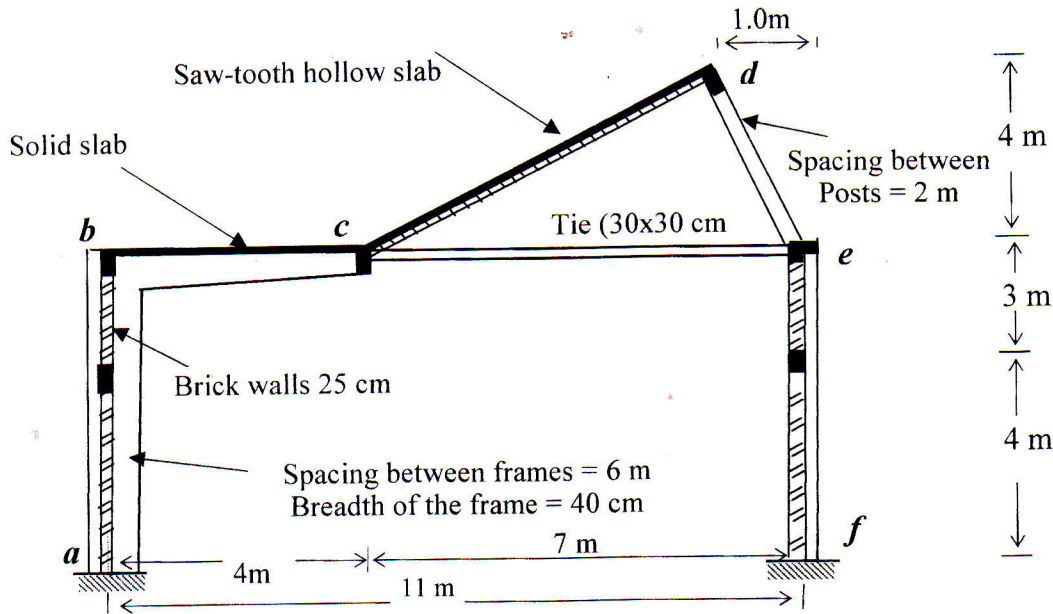


Figure (1)

Figure (1) shows a typical sectional elevation of the main supporting elements of a storage area. Spacing between the main elements is 6.0 m.

Given Data:

- $f_{cu} = 300 \text{ kg/cm}^2$, $f_y = 3600 \text{ kg/cm}^2$,
- Assume $LL+FC = 200 \text{ kg/m}^2$ (horizontal projection)
- Weight of cement hollow blocks $20 \times 20 \times 40$ is 16 kg/block.
- Weight of 25 cm thick brick walls is 500 kg/m^2 .

It is required the following:

- 1- Make complete design* for the saw-tooth slab type 'cde' (15%).
- 2- Make complete design* for the main supporting elements of the system 'abcef' neglecting the effect of wind. Calculate also the eccentricity of the footing at 'a' to get uniform pressure under the footing (30%).
- 3- Suggest and design a suitable system for the end gable 'abcdef' to resist uniform wind pressure 100 kg/m^2 . (15%).

* Complete Design = Design + Drawing.

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Question 2 (20 %)

Figure (2) shows a general layout of office building floor . The statical system is a reinforced concrete flat slab system. Using the empirical design method of analysis, and assuming appropriate loadings, 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 $f_{cu} = 250 \text{ kg/cm}^2$, $f_y = 3600 \text{ kg/cm}^2$..

Question 3 (10 %)

For the shown stair case , columns are allowed at intersection of axes, beams are allowed at the horizontal level only. Choose the statical system and design the stair showing all necessary details.

Question 4 (10 %)

Design the shown conical dome filled with water and subjected to hydrostatic pressure, neglecting the own weight of the shell.

Question 5 (10 %)

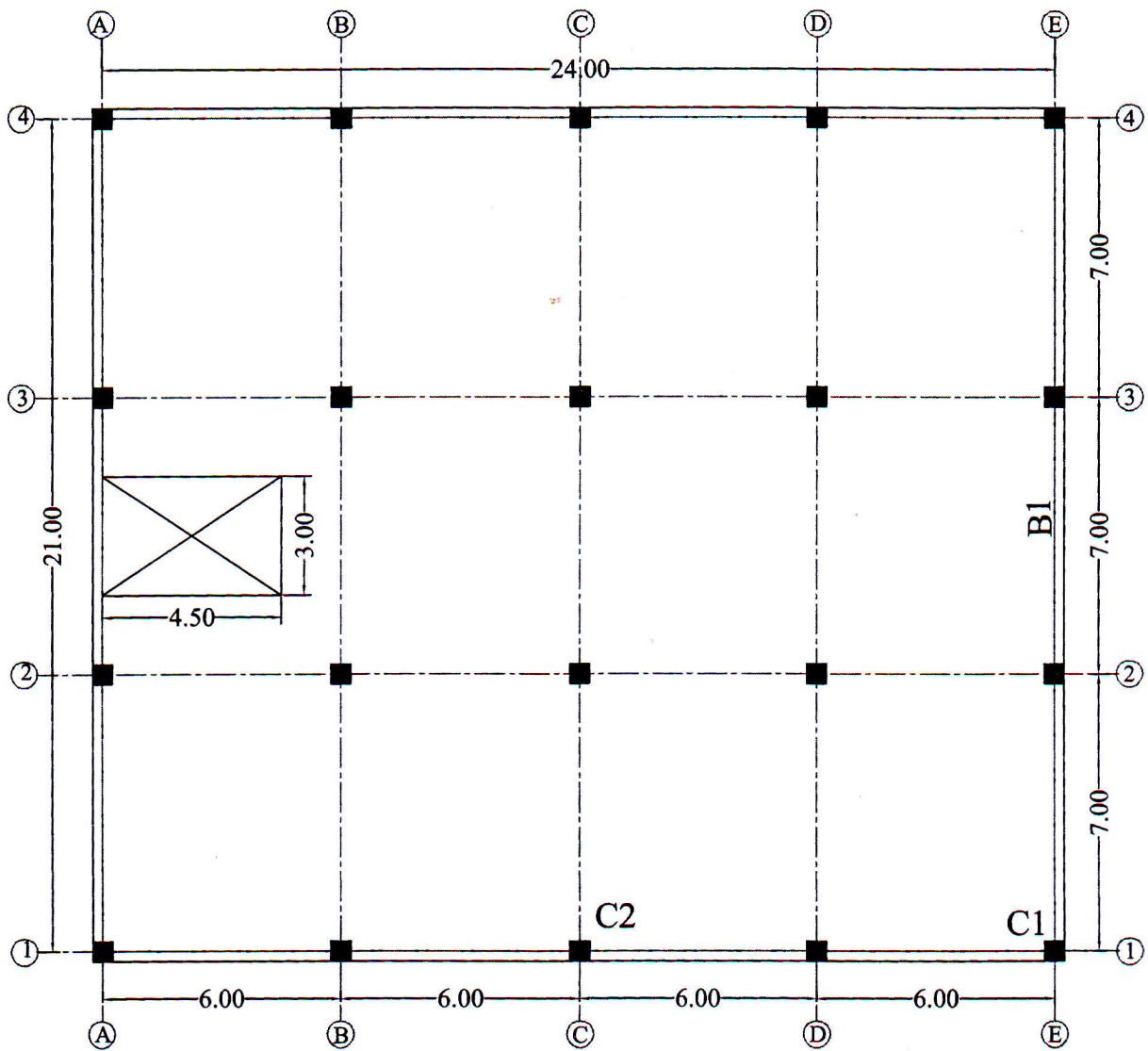
A reinforced concrete braced column of 6.0 m height and 25 cm width is subjected to a bending moment of 40 m.t and 180 t axial load (ultimate loads). The column is partly fixed at top and bottom in the main directions (x and y directions). Design the column showing all necessary details.

Question 5 (10 %)

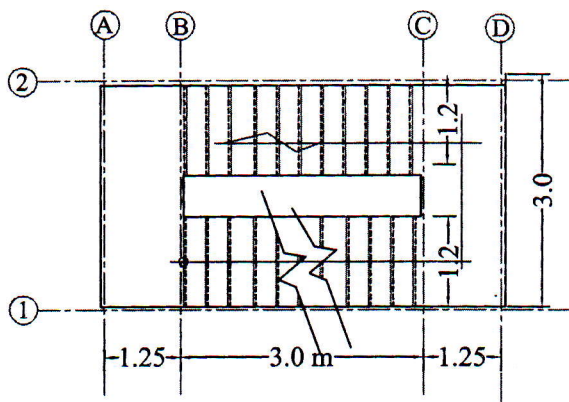
For the shown architectural plan for an apartment shown, It is required to make a suitable statical system showing : columns, beams, and slabs. Columns are allowed only at the intersections of axes.

* Complete Design = Design + Drawing.

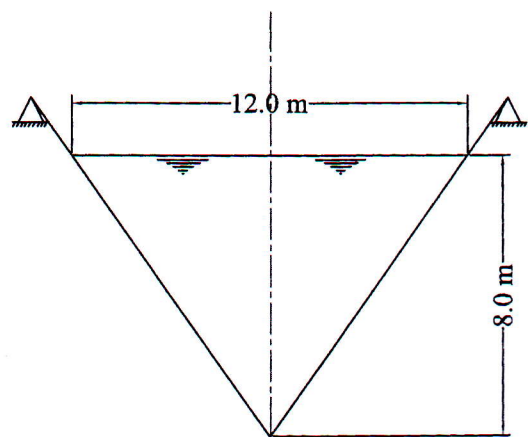
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Problem (2)



Problem (3)



Problem (4)

