

Reinforced Concrete Structures II-1

- Notes: 1. Any missing data is to be reasonably assumed.
 2. Design Aids can be used.
 3. The Exam consists of 2 pages.

Question 1 (60%)

The given plan in figure 1 shows the layout of a roof system designed as hollow-block using hidden beams system. The design concrete characteristic strength is equal to 25 MPa and the main steel used is 240/350. The height of the story is 3.50 m. The live load is 7.0 kN/m² and the flooring cover is 1.50 kN/m². It is required to:

- 1- Design a two way hollow-block slabs for the part of the roof between axis 1-1 and axis 4-4 using blocks of dimensions 20x20x40 cm. Draw the details of reinforcement of the designed slabs.
- 2- Design the hidden beam of axis 4-4 and draw the details of reinforcement.
- 3- In one of the spaces, arrange a cantilever type stair consisting of two flights and a width of the step 2.55 m. Design the stair and the stair beam and draw the reinforcement details.

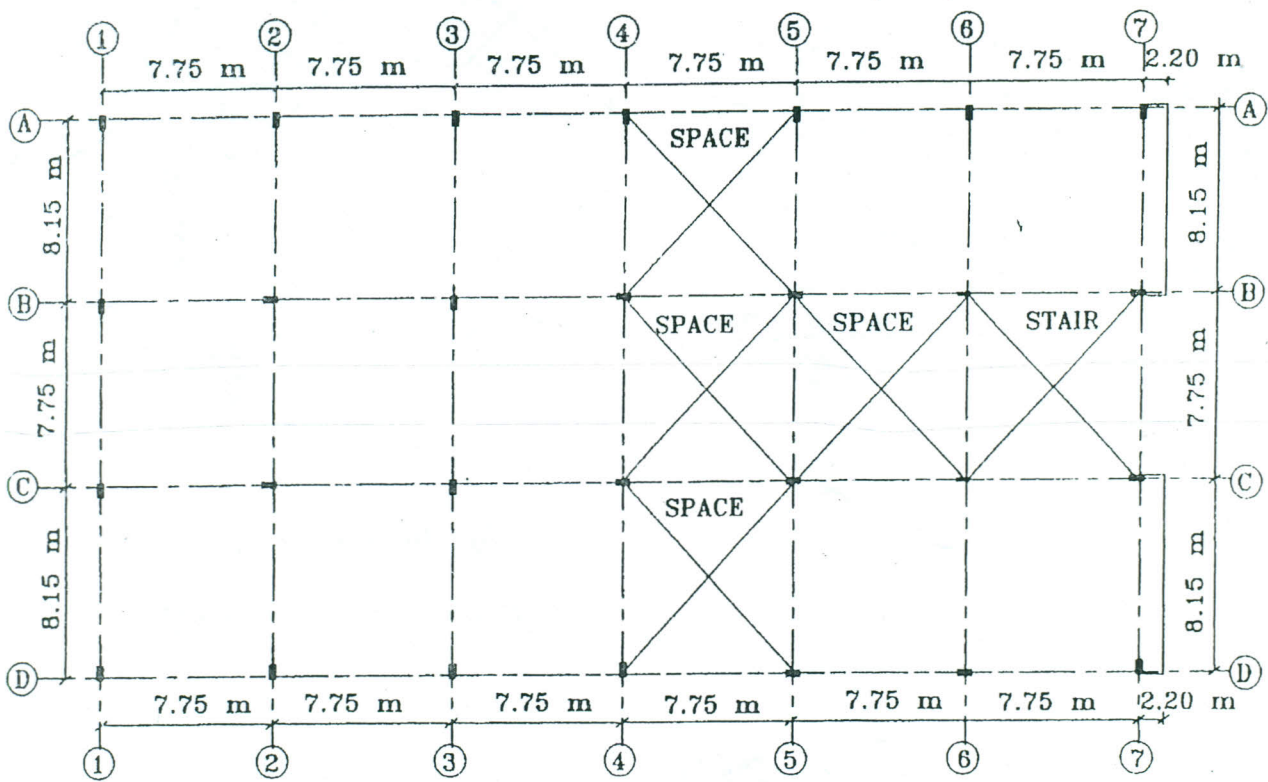


Fig. 1

Question 2 (40%)

The given plan in Fig. 2 shows the layout of a roof system. The part of the roof between axis 1-1 and axis 4-4 is to be designed as flat slab with external marginal beams. The design concrete characteristic strength is equal to 30 MPa and the main steel used is 360/520. The live load is 7.50 kN/m^2 and the flooring cover is 2.0 kN/m^2 . It is required to:

- 1- Design the external column strip and middle strip in the vertical direction.
- 2- Check the punching shear at the column on axis A-2.
- 3- Draw to a suitable scale the details of reinforcement of the designed strips.

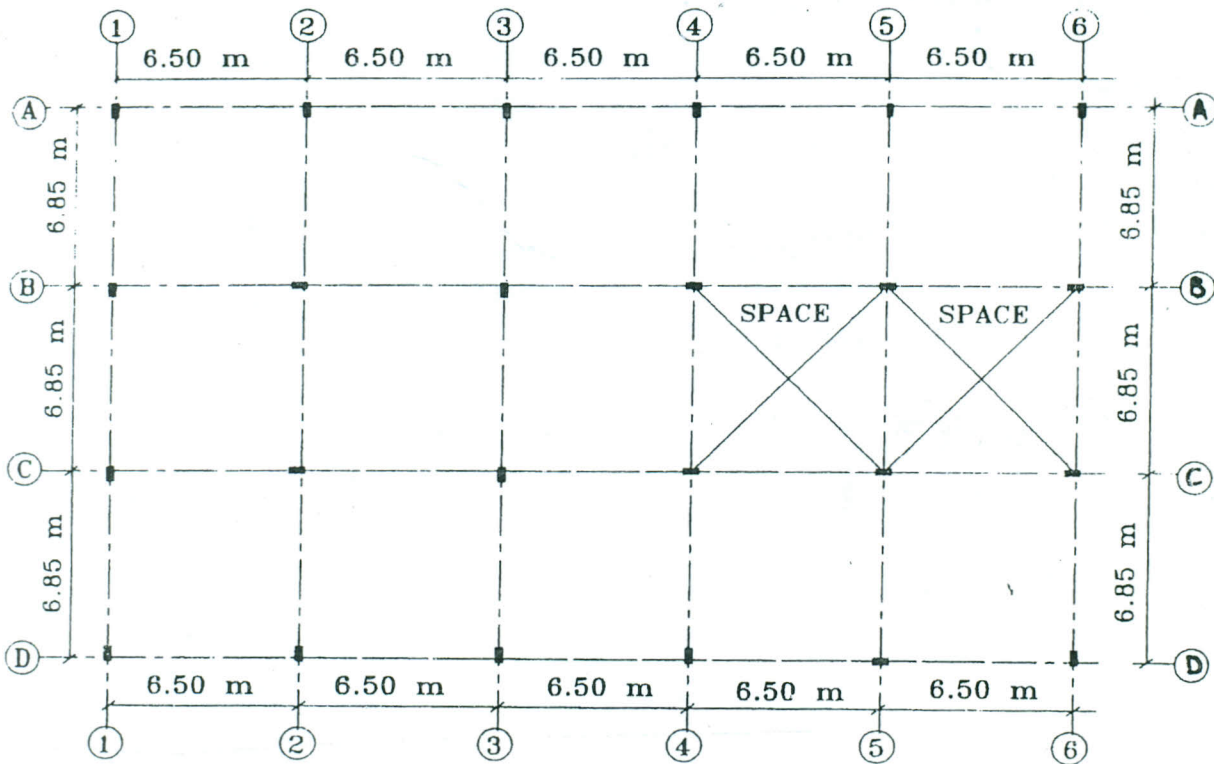


Fig. 2

*My best wishes,
Prof. Dr. Ahmed Yousef*