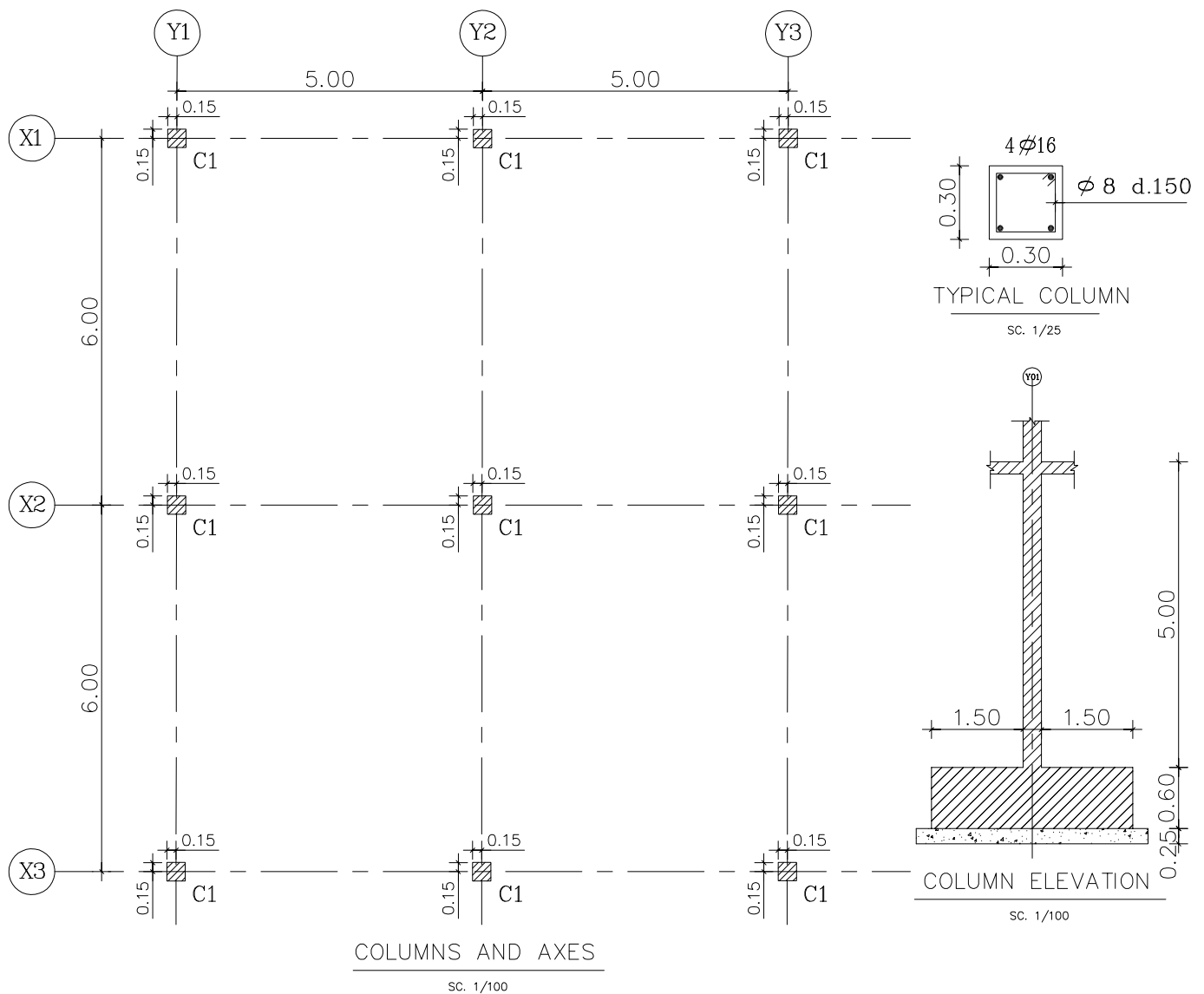
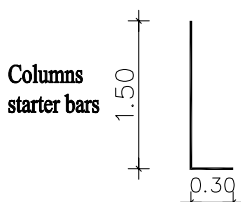


For the following figure:

- 1- Draw the columns and axes layout using the AutoCAD program.
- 2- Calculate the necessary reinforcement quantities for casting columns from the foundation level up to the Ground floor level.
- 3- Draw a section elevation for the typical column indicating bar marks and lengths for all bars.
- 4- Draw the bar bending schedule (BBS) using the AutoCAD program.



Notes:-



Rebars Weight	
Diameter	Unit Wt (kg/m)
ϕ 8	0.394
ϕ 10	0.617
ϕ 12	0.888
ϕ 14	1.208

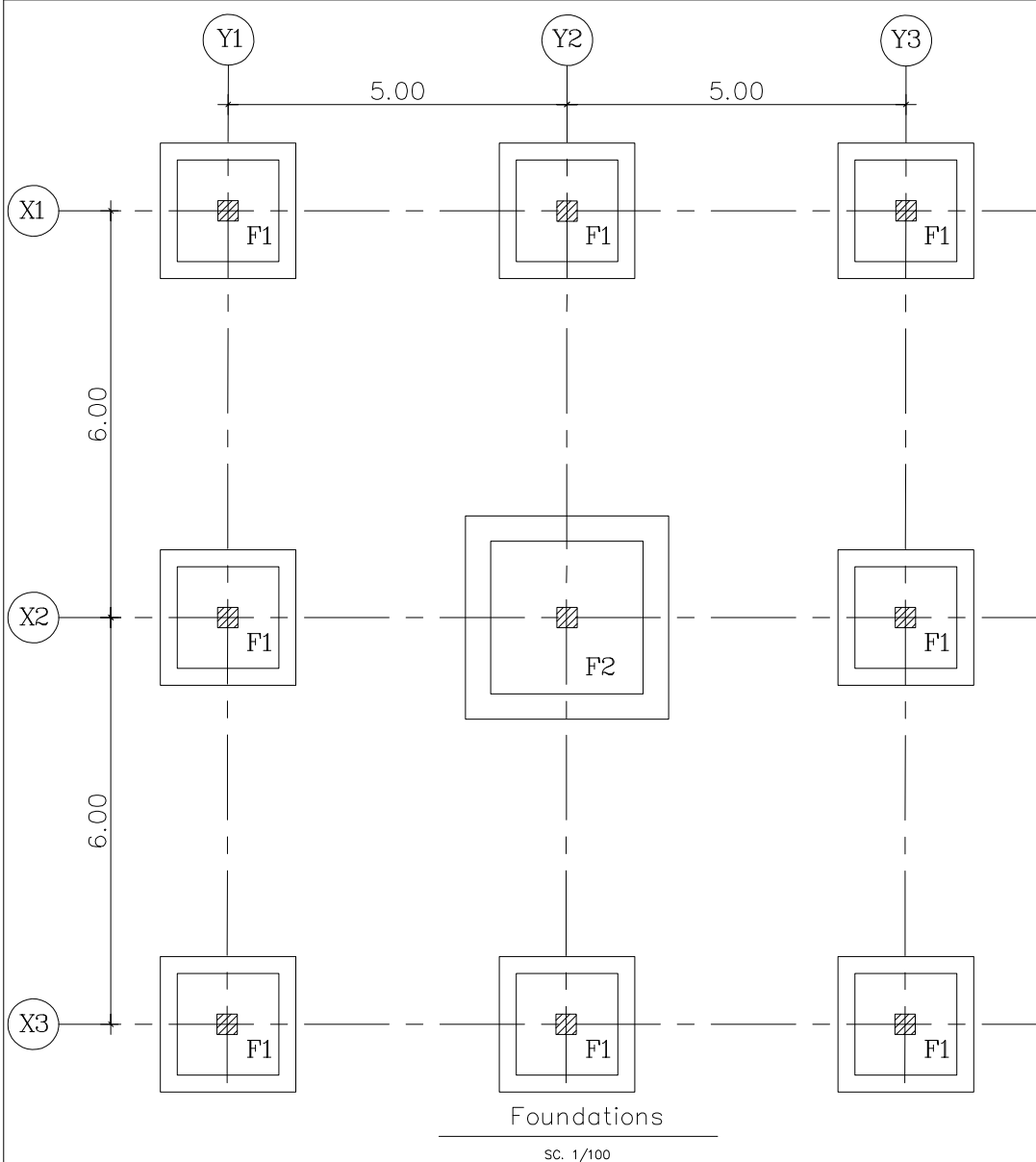
Diameter	Unit Wt (kg/m)
ϕ 16	1.578
ϕ 18	1.998
ϕ 20	2.466
ϕ 22	2.984
ϕ 25	3.853

\* Concrete grade  
 For Plain Concrete  $f_{cu}=20 \text{ N/mm}^2$   
 For Reinforcing Concrete  $f_{cu}=30 \text{ N/mm}^2$

LOCATION	CLEAR COVER
FOUNDATION	75 mm
BEAMS AND COLUMNS	30 mm
SLABS	25 mm

For the following figure:

- 1- Draw the foundation layout using the AutoCAD program.
- 2- Calculate the necessary reinforcement quantities for casting foundations.
- 3- Draw a plan for the typical footing indicating bar marks and lengths for all bars.
- 4- Draw the bar bending schedule (BBS) using the AutoCAD program.



SCHEDULE FOR FOOTINGS

TYPE	DIMENSIONS OF P.C. (M)			DIMENSIONS OF R.C. (M)		
	LENGTH	WIDTH	THICK.	LENGTH	WIDTH	THICK.
F1	2.00	2.00	0.25	1.50	1.50	0.50
F2	3.00	3.00	0.25	2.50	2.50	0.70

**FOUNDATIONS:**

- 1- MINIMUM BEARING CAPACITY AT FOUNDATION LEVEL SHOULD NOT BE LESS THAN 1.00 Kg/cm .
- 2- ANTI-SULPHATE CEMENT IS TO BE USED FOR UNDER-GROUND PART OF THE STRUCTURE .
- 3- BURIED PARTS OF THE STRUCTURE SHOULD BE WATERTIGHT . CONTRACTOR SHOULD TAKE THE NECESSARY MEASURES TO PREVENT WATER SEEPAGE AFTER CONSTRUCTION COMPLETION .

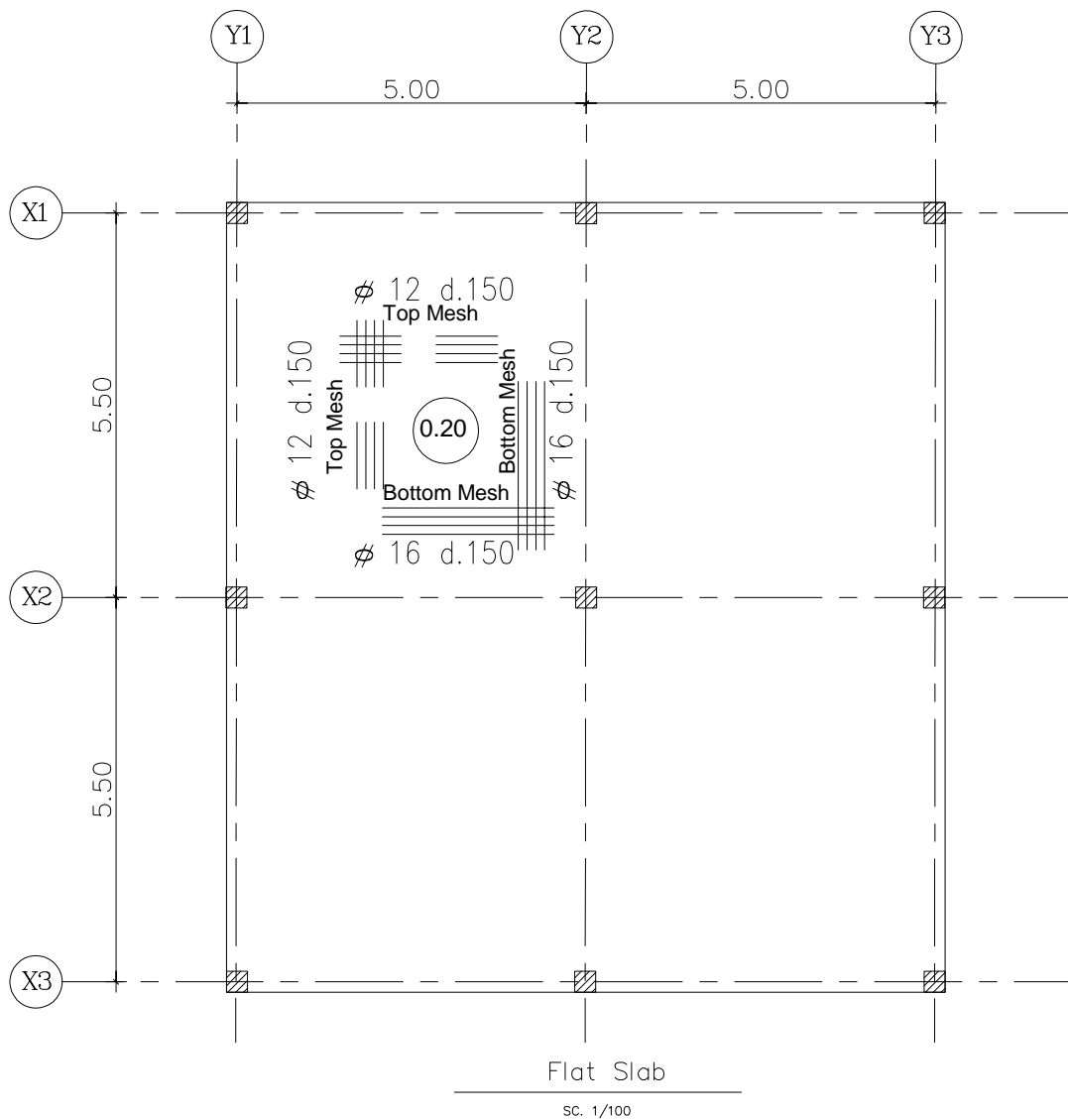
Rebars Weight		Diameter	Unit Wt (kg/m)
Diameter	Unit Wt (kg/m)		
ϕ 8	0.394	ϕ 16	1.578
ϕ 10	0.617	ϕ 18	1.998
ϕ 12	0.888	ϕ 20	2.466
ϕ 14	1.208	ϕ 22	2.984
		ϕ 25	3.853

\* Concrete grade  
For Plain Concrete  $f_{cu}=20 \text{ N/mm}^2$   
For Reinforcing Concrete  $f_{cu}=30 \text{ N/mm}^2$

LOCATION	CLEAR COVER
FOUNDATION	75 mm
BEAMS AND COLUMNS	30 mm
SLABS	25 mm

For the following figure:

- 1- Draw the slab layout using the AutoCAD program.
- 2- Calculate the necessary reinforcement quantities for casting the slab.
- 3- Draw a plan indicating bar marks and lengths for all bars.
- 4- Draw the bar bending schedule (BBS) using the AutoCAD program.



Rebars Weight		Diameter	Unit Wt (kg/m)
Diameter	Unit Wt (kg/m)		
φ 8	0.394	φ 16	1.578
φ 10	0.617	φ 18	1.998
φ 12	0.888	φ 20	2.466
φ 14	1.208	φ 22	2.984
		φ 25	3.853

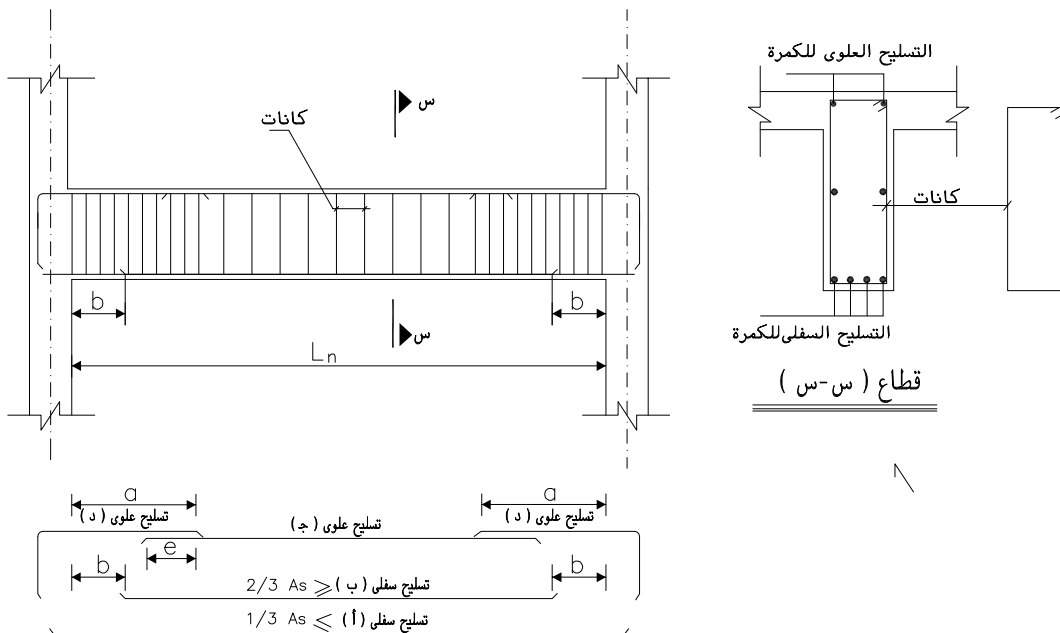
\* Concrete grade  
 For Plain Concrete  $f_{cu}=20 \text{ N/mm}^2$   
 For Reinforcing Concrete  $f_{cu}=30 \text{ N/mm}^2$

LOCATION	CLEAR COVER
FOUNDATION	75 mm
BEAMS AND COLUMNS	30 mm
SLABS	25 mm

Using the beams table and details

- 1- Draw the elevation and sections of Beams B1, B2 and B3 the AutoCAD program.
- 2- Calculate the necessary reinforcement quantities for all beams.
- 3- Draw the bar bending schedule (BBS) for all beams using the AutoCAD program.

The Beam clear span is 6.0m with width of 0.25m and a depth of 0.60m, assume the column width is 0.50m.



Beams' Table :

TYPE	Length
a	Min. 0.15 L <sub>n</sub>
b	Max. 0.10 L <sub>n</sub>
e	Bigger of (12 ϕ or 25 cm)

Beam Type	Bot. Rft.	Top. Rft.	Stirrups/m			Remarks			
	Long	Short	Right	Mid.	Left				
B1	2ϕ12	2ϕ16	2ϕ12	2ϕ12	2ϕ12	628	528	628	
B2	2ϕ16	2ϕ16	2ϕ16	2ϕ12	2ϕ16	5ϕ10	528	5ϕ10	
B3	2ϕ18	2ϕ18	2ϕ16	2ϕ12	2ϕ16	7ϕ10	628	7ϕ10	

Rebars Weight		Diameter	Unit Wt (kg/m)
Diameter	Unit Wt (kg/m)		
ϕ 8	0.394	ϕ 16	1.578
ϕ 10	0.617	ϕ 18	1.998
ϕ 12	0.888	ϕ 20	2.466
ϕ 14	1.208	ϕ 22	2.984
		ϕ 25	3.853

\* Concrete grade  
For Plain Concrete  $f_{cu}=20 \text{ N/mm}^2$   
For Reinforcing Concrete  $f_{cu}=30 \text{ N/mm}^2$

LOCATION	CLEAR COVER
FOUNDATION	75 mm
BEAMS AND COLUMNS	30 mm
SLABS	25 mm