

Benha University Benha Faculty of Engineering Semester: Second No. of Pages: 3 Department: Civil Engineering Program : Under graduate Subject: Design Project for RC Structures (1) Code: C1252



Any data not given is to be reasonably assumed.

All calculations and sketches should be clear and neat

Material properties (f_{cu} = 30 N/mm², f_y = 400 N/mm² for H.G.S, f_y = 280 N/mm² for Mild Steel)

Figure (1) shows the typical floor building, with the following data:

There are walls for all beams

Wall thickness = 250 mm
Density of brick walls (including plaster) = 18 kN/m³
All columns = 300x500 mm

Variables

| Live Load (L.L) | $= 2 \text{ kN/m}^2$ |
|---------------------|----------------------|
| | $= 3 \text{ kN/m}^2$ |
| | $=4 \text{ kN/m}^2$ |
| Height of Floor (H) | = 3000 mm |
| | = 4000 mm |
| | = 5000 mm |
| Dimension A | = 4000 mm |
| | = 4750 mm |
| | = 5500 mm |
| Dimension B | = 3500 mm |
| | = 4500 mm |
| | = 5500 mm |

It is required:

- 1- Design of RC slab and draw the reinforcement details on plan.
- 2- Design of B1 and B2 in the plan against bending moment and shear.
- 3- Write down the beam schedule for B1 and B2 in the plan.
- 4- Give neat sketches of all reinforcement details for Beam B1, (using the moment of resistance diagram).



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All dimension millimeter



Figure (1)





For the cross-sections shown in Figure (2)

- Determine the Moment of Resistance of EACH section if $t_s = 100 \text{ mm}$ $A_s' = 0.2 A_s$
- Determine the A_s balanced for EACH section with the following data:

$$E_s = 210 \text{ GPa}$$

 $\boldsymbol{\varepsilon}_c = 0.0035$





Sec (B)



Sec (C)

Figure (2)

Variables of Sections

| Code | b | t | f_{cu} | As |
|------|-----|-----|-------------------|--------|
| | mm | mm | N/mm ² | mm^2 |
| Ι | 150 | 500 | 250 | 1000 |
| II | 200 | 600 | 300 | 1500 |
| III | 250 | 700 | 350 | 2000 |