

**Question (1) (25 marks)**

For main girder ABC in structural plan, it is required to Calculate load for shear and moment

Data:

Weight of wall = 4 kN/m<sup>2</sup>

height of floor = 3.2 m.

Width of girder = 300 mm,

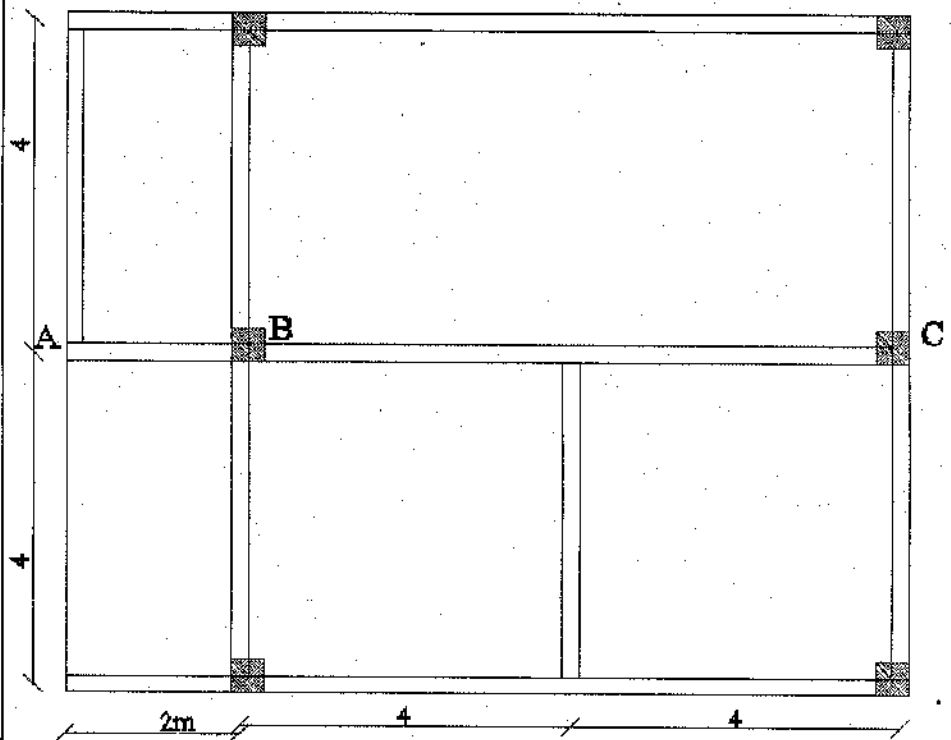
depth of girder = 800 mm .

Width and thickness of other beams = 250 mm and 600 mm.

Slab thickness = 120 mm ,

Covering = 1.5 kN/m<sup>2</sup>

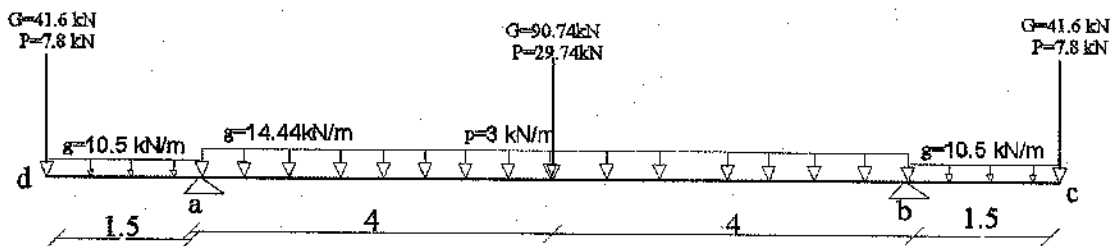
L.L.= 3 kN/m<sup>2</sup>



structural plan

L 2x	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
$\alpha$	.667	.725	.769	.803	.829	.852	.870	.885	.897	.908	.917
$\beta$	.500	.545	.583	.615	.643	.667	.688	.706	.722	.737	.750

**Question (2) (15 marks) :** For the following beam, Draw absolute bending moment diagram and shearing force diagram.



**Question (3) (10 marks) :** Design a rectangular section with width 200mm, subjected to M<sub>uL</sub> of 600 kN.m. Choose suitable depth and find corresponding steel. Design by design aids method (C1-J).  $f_y = 350 \text{ N/mm}^2$ , and  $f_{cu} = 30 \text{ N/mm}^2$

c/d	C1		J
	c/d	J	
0.1250	4.954	0.828	
0.1375	4.840	0.821	
0.1500	4.455	0.817	
0.1625	4.291	0.813	
0.1750	4.146	0.808	
0.1875	4.016	0.804	
0.2000	3.899	0.800	
0.2125	3.793	0.796	
0.2250	3.697	0.791	
0.2375	3.608	0.786	
0.2500	3.526	0.782	
0.2625	3.451	0.778	
0.2750	3.381	0.773	
0.2875	3.316	0.769	
0.3000	3.255	0.765	
0.3125	3.199	0.760	
0.3250	3.145	0.756	
0.3375	3.086	0.752	
0.3500	3.049	0.747	
0.3625	3.004	0.743	
0.3750	2.963	0.739	
0.3875	2.923	0.734	
0.4000	2.886	0.730	
0.4125	2.850	0.726	
0.4250	2.816	0.721	
0.4375	2.784	0.717	
0.4500	2.753	0.713	
0.4625	2.724	0.708	
0.4750	2.696	0.704	
0.4875	2.670	0.700	
0.5000	2.645	0.695	