

B. CONS. ENGG. 3RD YEAR 2ND SEMESTER EXAM. 2023

DESIGN OF STRUCTURE – III

Part - I (Full Marks: 50)

Use Separate Answer Script for Each Part

Answer Question No. 1 and any One Question.

Assume suitable data not provided. Use relevant design codes

A multi-storeyed **RCC Office Building** will be constructed at **Gangasagar**, South 24 Parganas, West Bengal. The **Plan & Elevation** and other details are shown below.

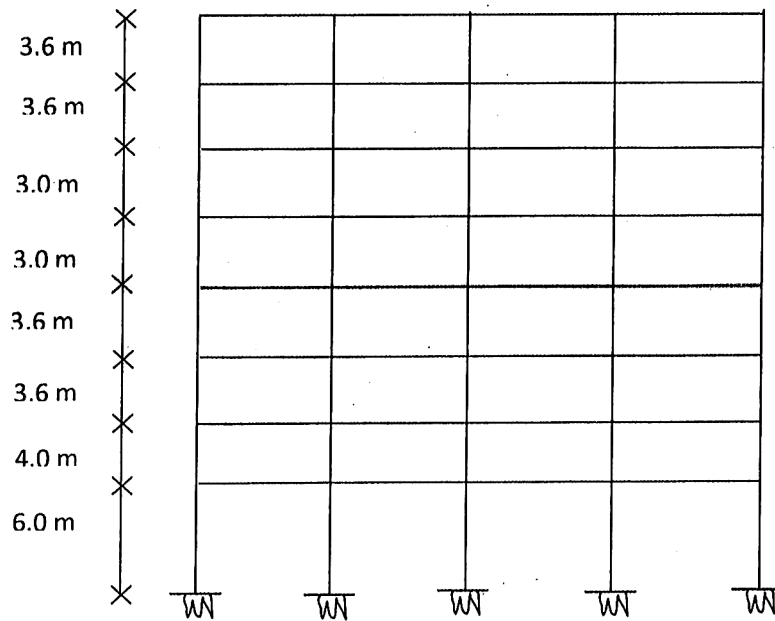
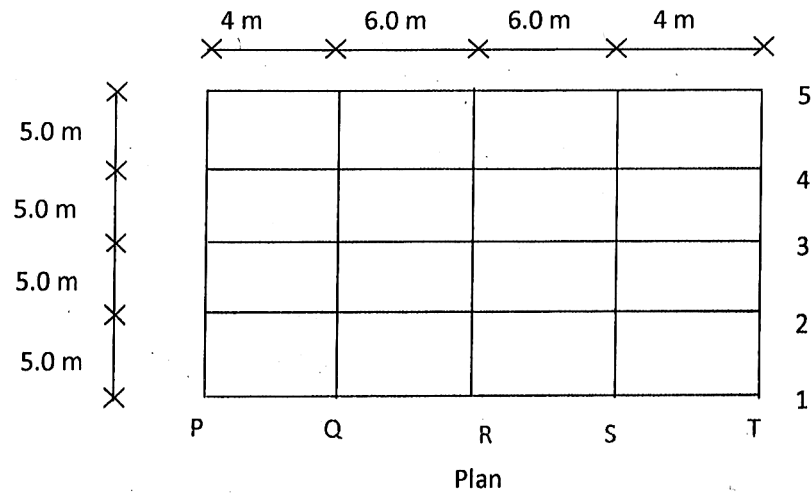


Fig. 1: (Elevation)

Thicknesses of outer & inner brick walls are **200 mm & 100 mm** respectively. **Design Live load** = 4 kN/m^2 , Slab thickness = 150 mm, Floor finish = 50 mm, Plaster = 10 mm (ceiling) & 25 mm (wall). Columns sizes are 500 mm X 500 mm and the size of all beams is 250 mm X 400 mm. The **grade of concrete is M 30**. Assume any other relevant data not provided

1. What are the design (**Dead + Live**) **Load** on the frame **2/P-Q-R-S** at **1st Floor** level as shown in Fig 1. Calculate the Support Moments of the said frame by **Moment Distribution Method** **25**

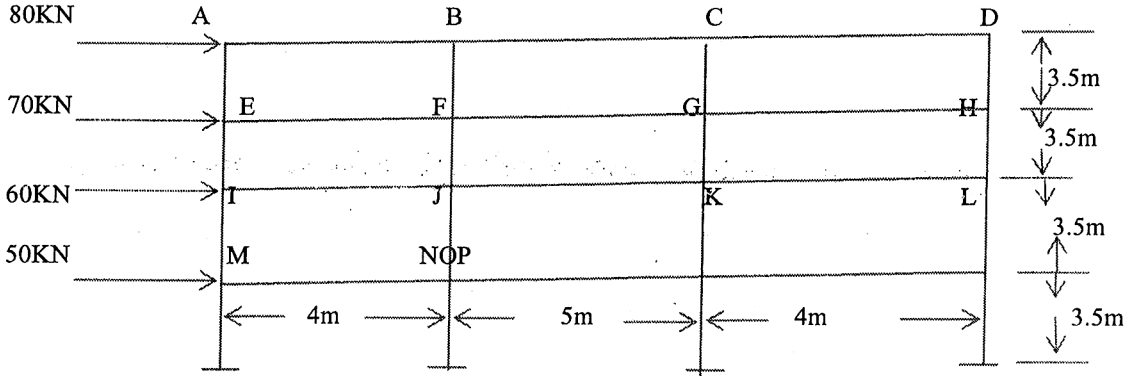
2. Calculate the Wind Force at each floor level of the frame **Q/ 1-2-3-4-5** as per relevant IS code. Calculate and show the Bending Moment and Shear force diagram of the same frame from roof to 6th floor level. **25**

3. Calculate the **Base Shear and Story Shear** due to **seismic load** at each floor level of the frame **2/P-Q-R-S** of Fig. 1 as per relevant IS code. Calculate and Show the Bending Moment Diagram of the same frame at **4th Floor** level by **Portal Method**. **25**

B. Construction Engineering 3rd year 2nd Semester Examination – 2023
 Subject: Design of structure-III

Total Time: 3 hour
 Full Marks: 100

PART-II (Full Marks-50)
 Use separate answer sheet for each part.
 Answer all the Questions

<p>CO2 [20]</p>	<p>[1] Analyses the frame by portal method and draw the SFD and BMD .</p>  <p>The diagram shows a four-story portal frame with four columns (A, B, C, D) and four levels (E, F, G, H; I, J, K, L; M, N, O, P). Horizontal loads are applied to the left of each level: 80 kN at level E, 70 kN at level I, 60 kN at level M, and 50 kN at level P. The horizontal dimensions are 4m between columns A and B, 5m between B and C, and 4m between C and D. The vertical dimensions are 3.5m between each level (E-I, I-M, M-P).</p>															
<p>CO4 [10]</p>	<p>[2] Design a simple shear wall of length 8m and thickness 300mm. uses M25 Grade concrete & Fe-500 Grade Steel. Use the following data. Assume any other data if required.</p> <table border="1" data-bbox="199 1153 1412 1265"> <thead> <tr> <th>SL.No.</th> <th>Loading</th> <th>Axial Force (KN)</th> <th>Moment (KNM)</th> <th>Shear Force (KN)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>DL+LL</td> <td>1500</td> <td>600</td> <td>300</td> </tr> <tr> <td>2</td> <td>EL</td> <td>400</td> <td>4000</td> <td>600</td> </tr> </tbody> </table>	SL.No.	Loading	Axial Force (KN)	Moment (KNM)	Shear Force (KN)	1	DL+LL	1500	600	300	2	EL	400	4000	600
SL.No.	Loading	Axial Force (KN)	Moment (KNM)	Shear Force (KN)												
1	DL+LL	1500	600	300												
2	EL	400	4000	600												
<p>CO5 [20]</p>	<p>[3] Answer all the questions from this block. [4X5=20] (a) Write the name of different types of Machine foundation along with sketches. [5] (b) Draw the different type of Roof truss. [5] (c) Write short notes on scaffolding, formwork and shuttering. [5] (d) Write the name of different types of RCC shear wall along with sketches. [5] (e) Write all the steps of Form work design.</p>															

The students of the course should be able to

CO1: Analysis & Design Tall Structure, Wind & Earthquake Forces, (K4)

CO2: Demonstrate Portal & Kani's Method (K2)

CO3: Application in Earthquake Resistant Design & Response Spectrum Method (K3)

CO4: Analysis & Design & Shear Wall in Tall Structures, (K4)

CO5: Describe Machine Foundation, Industrial Structure, Form Work Design (K1)