

DESIGN OF STRUCTURE – III

Part - I (Full Marks: 50)

Use **Separate Answer Script** for Each Part

Answer any **Two Questions**.

Assume suitable data not provided. Use relevant design codes

A multi-storeyed **RCC Residential Building** will be constructed at **Purulia, West Bengal**. The **Plan & Elevation** and other details are shown below.

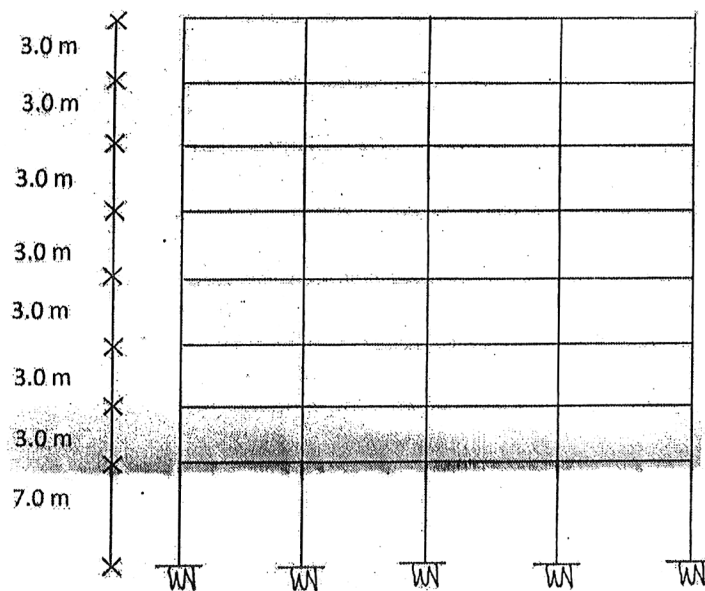
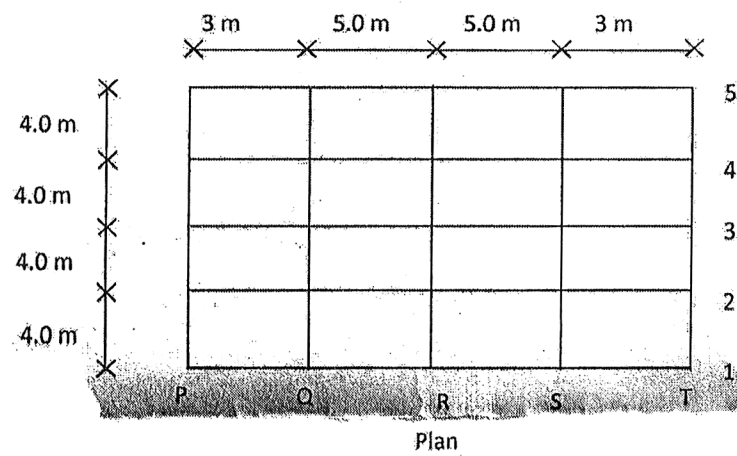


Fig. 1: (Elevation)

[Turn over

Thicknesses of outer & inner brick walls are 250 mm & 125 mm respectively. Design Live load = 2 kN/m^2 , Slab thickness = 100 mm, Floor finish = 50 mm, Plaster = 10 mm (ceiling) & 25 mm (wall). Columns sizes are 450 mm X 450 mm and the size of all beams is 250 mm X 400 mm. The grade of concrete is M 25. Assume any other relevant data not provided

1. What are the design (Dead + Live) Load on the frame 3/P-Q-R-S-T at 3rd Floor level as shown in Fig. 1. Calculate the Support Moments of the said frame by **Moment Distribution Method** 25

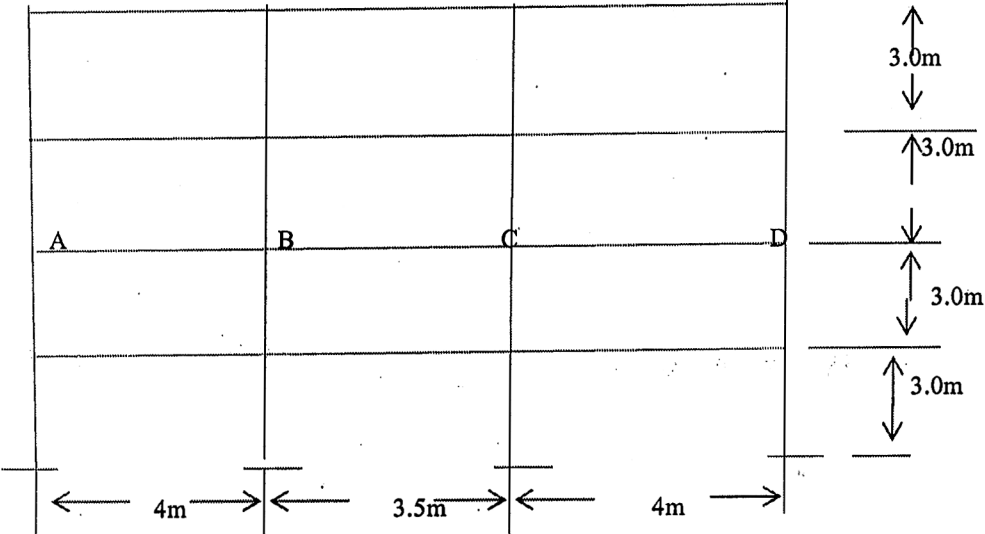
2. Calculate the **Wind Force** at each floor level of the frame R/ 1-2-3-4-5 as per relevant IS code. Calculate and show the Bending Moment and Shear force diagram of the same frame from Roof to 6th floor level. 25

3. Calculate the **Base Shear and Story Shear** due to seismic load at each floor level of the frame 3/P-Q-R-S-T of Fig. 1 as per relevant IS code. Calculate and Show the Bending Moment Diagram of the same frame at 6th Floor level by **Portal Method.** 25

B. Construction Engineering 3rd year 2nd Semesters supplementary 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 Question

<p>CO2 [20]</p>	<p>1. A G+ 3 Storied building 2nd floor level frame (ABCD) as shown in figure. The floor-to-floor height of the building is 3.0 meter. Find the max (+) BM FOR Span BC . Assume any other data if required. Assume size of the beam =450X 300 mm and size of the column 400X400 mm. Live load on AB=6 KN/m, Live load on BC= 10 KN/m, Live load on CD=12KN/m. use method of substitute frame. Draw also the net BMD for span BC. Use method of substitute frame.</p> 															
<p>CO4 [20]</p>	<p>[2] Design a simple shear wall of length 5m 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="209 1529 1418 1715"> <thead> <tr> <th>SL.No.</th> <th>Loading</th> <th>Axial Force(KN)</th> <th>Moment (KNM)</th> <th>Sear (KN)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>DL+LL</td> <td>1500</td> <td>550</td> <td>300</td> </tr> <tr> <td>2</td> <td>EL</td> <td>350</td> <td>4000</td> <td>600</td> </tr> </tbody> </table>	SL.No.	Loading	Axial Force(KN)	Moment (KNM)	Sear (KN)	1	DL+LL	1500	550	300	2	EL	350	4000	600
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1	DL+LL	1500	550	300												
2	EL	350	4000	600												
<p>CO5 [10]</p>	<p>[3] answer any two questions. (a) Write a Short Note Machine foundation? Write the different type of Machine foundation along with sketch. [5] (b) Draw the different type of Roof truss. [5] (c) Write the different steps/parameters for formwork design. [5]</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)