

B. CONS. ENGG. 4<sup>TH</sup> YEAR 1<sup>ST</sup> SEM SUPPLYMENTARY EXAM.-2017

## DESIGN OF STRUCTURE – III

Time: 3 Hours

Part – I,

Full Marks: 100

Answer any **two questions**. Assume suitable data not provided. Use relevant design codes.

A multi-storeyed **RCC residential building** will be constructed at terrain category II of **Kolkata**. The plan & elevation are shown in Fig 1. The thicknesses of outer & inner walls are 250 mm & 125 mm respectively. Design Live load = 2 kN/m<sup>2</sup>. Slab thickness = 125 mm, floor finish = 30 mm, ceiling plaster = 10 mm. Total wall plaster in both sides = 25 mm. The sizes of the columns are 400 mm X 400 mm and the size of all beams is 250 mm X 450 mm. The grade of concrete is M20.

1. a) Discuss the **Portal method** and its assumptions 5
  - b) Calculate the design forces due to wind load as per IS: 875 Part – III at all floor level of the frame of the multi-storied building as shown in Fig.1. Calculate the bending moment, Shear force in beams & bending moment & axial forces in columns of the frame **A-B-C-D-E/ 3 at 3<sup>rd</sup> Floor** level by Portal method. 20
2. a) Discuss Response Spectrum method and the role of ductile detailing of reinforcement in earthquake resistant design. 5
  - b) Calculate the design lateral forces due to seismic load at each floor level of the frame **A-B-C-D-E/ 3**. Evaluate the maximum bending moment and axial force in columns & bending moment in beams in frame **A-B-C-D-E/3 at 4<sup>th</sup> Floor** level. 20
3. Calculate the load analysis and draw the **Design Moment** of the frame **A-B-C-D-E/3 at 2<sup>nd</sup> Floor** level for **Dead + Live loads**. 25

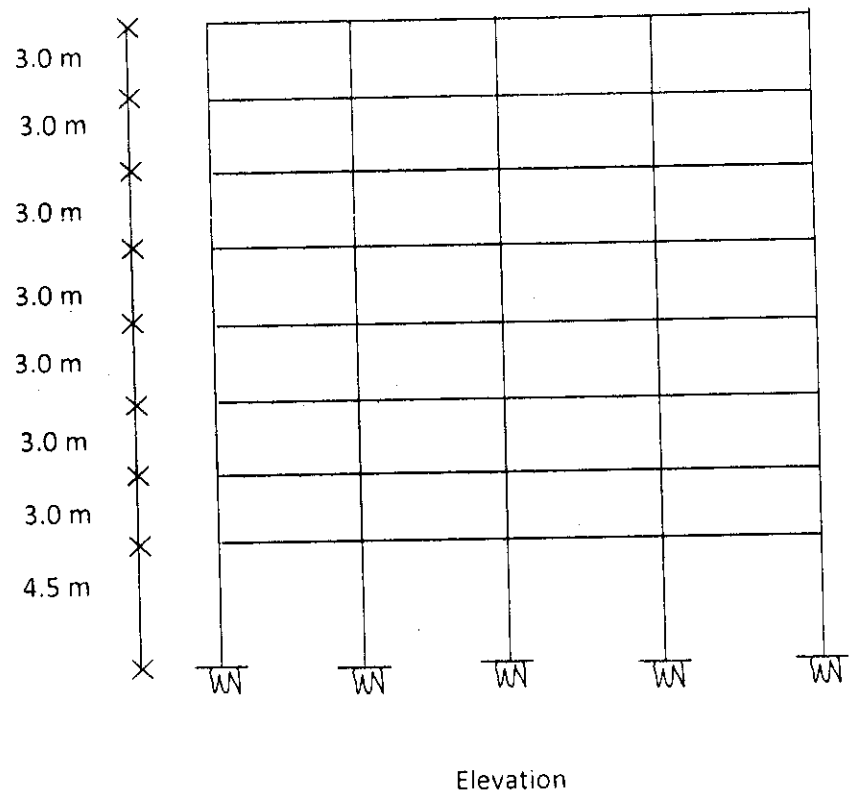
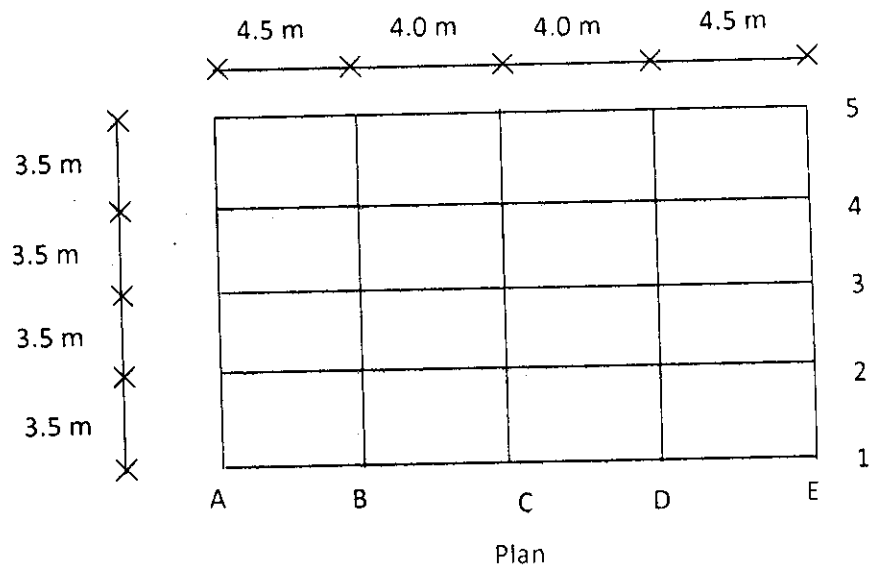


Fig 1: Plan & Elevation of Multi-storied Building at Kolkata

Exam: B. Construction 4<sup>th</sup> Year 1<sup>ST</sup> Semester Supplementary Exam.-2017

Department: Construction Engineering

Sub: Design of Structure-III

Year: 4<sup>th</sup> year 1<sup>st</sup> Semester (Supplementary Examination)

Part-II

Use separate answer sheet for each part.

Answer any two questions (25X2=50)

- 1) A G+3 storied building 2<sup>nd</sup> floor level frame as shown in figure. The floor to floor height of the building is 4m. Find the May (+) B.M for span BC Assume any other data if required. Assumed size of beam =450X300(mm) and Size of Column 400X300. LL=5KN/m for AB, BC=8KN/m & CD=6KN/m, Use method of substitute frame. Draw also the BMD for Span BC.

