B. CONS.ENGG. 4TH YEAR 1ST. SEM. EXAM.-2018

DESIGN OF STRUCTURE – III, Part –I,

Full Marks : 100

Time : Three hours

Answer any **Two questions**. Assume suitable data not provided
Use of IS: 456, 2000, IS: 1893 (Part-I) 2016 are allowed.
Answer with neat sketches.

1. a) Discuss Portal method mentioning the assumptions.   **5**

    b) A multi-storied RCC office building to be constructed at **Agartala** at terrain category II. The plan & elevation are shown in Fig–1. The thicknesses of outer & inner walls are 200 mm & 125 mm respectively. Live load = 4 kN/ m², Slab thickness = 125 mm, floor finish = 30 mm, ceiling plaster = 10 mm. Calculate the design forces due to wind load as per IS: 875 Part –III, at all floor level of the frame R/1-2-3-4-5 Evaluate the bending moment, Shear force and axial forces in beams & columns of the frame R/1-2-3-4-5 at **5th floor** level by Portal method.

    20

2. Calculate the design span moments due to Dead + Live load of the frame at **4th Floor** level of the frame P-Q-R-S/3 of Problem 1 as shown in Fig.1. Draw neat sketch & detail calculations. Assume Live Load on slab = 4 KN/m².

    25

3. a) Discuss **Response Spectrum** method for seismic design of structure?   **5**

    b) Calculate the design seismic forces at each floor of the multi-storied building as stated in problem 1 & Fig. 1 and evaluate the maximum bending moments & axial forces in columns & bending moment in beams at **3rd floor** level of the frame **PQRS/2** by Portal method.   **20**

5.0 m   6.0 m   5.0 m

5.5 m

4.5 m

4.5 m

5.5 m

P   Q   R   S

5 4 3 2 1

Plan
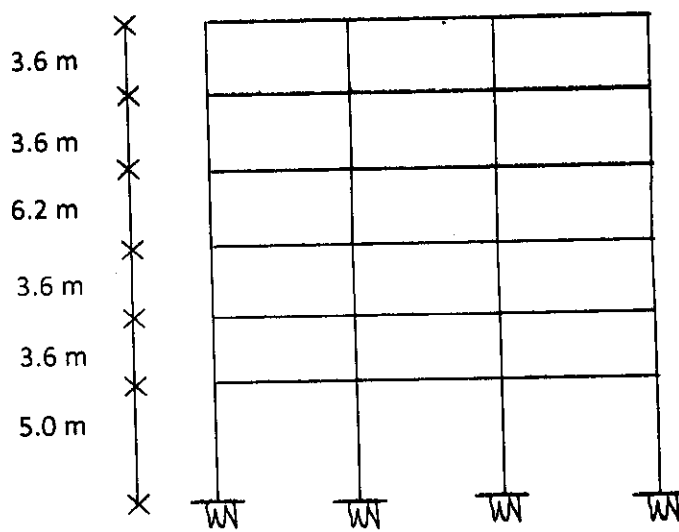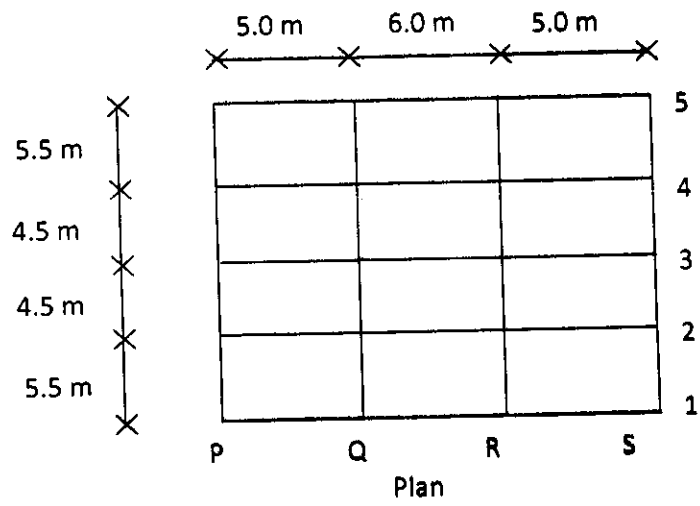
3.6 m

3.6 m

6.2 m

3.6 m

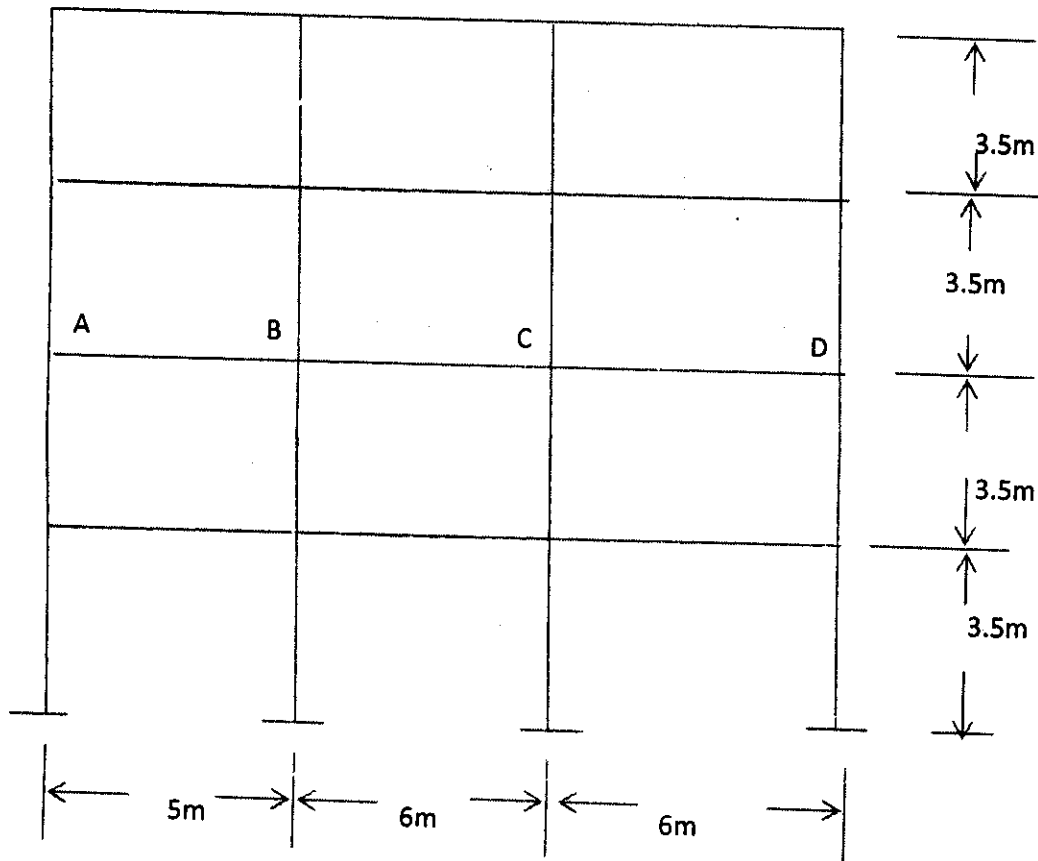3.6 m

5.0 m

Fig. 1: (Elevation)

B.E. construction Engineering 4th year 1st Semester Examination 2018
Sub: Design of Structure-III
PART-II
Answer any two questions [25X2=50]

1.A G+ 3 Storied building 2nd floor level frame as shown in figure in . The floor to floor height of the building is 3.5 meter. Find the max (+) BM for Span CD . Assume any other if required. Assume size of the beam =450X 300 mm and size of the column 300X500 mm. Live load on AB=8 KN/m , Live load on BC= 12 KN/m, Live load on CD=15KN/m. use method of substitute frame. Draw also the net BMD for span CD.

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   ┌──────────┬─────────────┬─────────────┐        ↑
   │          │             │             │        │
   │          │             │             │        3.5m
   ├──────────┼─────────────┼─────────────┤        ↓
   │          │             │             │        ↑
   │          │             │             │        │
   │          │             │             │        3.5m
 A │        B │           C │           D │        │
   ├──────────┼─────────────┼─────────────┤        ↓
   │          │             │             │        ↑
   │          │             │             │        │
   │          │             │             │        3.5m
   │          │             │             │        ↓
   ├──────────┼─────────────┼─────────────┤        ↑
   │          │             │             │        │
   │          │             │             │        3.5m
   │          │             │             │        ↓
   
   |←  5m  →|←    6m    →|←    6m    →|
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2. Design a simple shear wall of length 6m and thickness 300mm. uses M30 Grade concrete &Fe-500 Grade Steel. Use the following data. Assume any other data if required.

SL.No.	Loading	Axial Force(KN)	Moment (KNM)	Sear (KN)
1	DL+LL	1500	500	300
2	EL	300	4000	600

3. A G+3 Storied building as shown in figure. The floor to floor height of the building is 3.5 m. assume any other data if required. Find the beam shear by EFGH & Column moment of DH,HL,LO by cantilever method.