

**BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI**  
**Second Semester (2022-23)**  
**MIDSEMESTERTEST (13/03/2023)**

Course No. CE G618  
Course Title: Design of Multistoried Building

Weightage: 30 %  
Duration: 90 min.

**Q.1 a) State True/False and Justify**

**[5]**

- i) Shear wall in a multistoried building does not carry vertical loads.
- ii) The vertical reinforcement in masonry walls is provided as per guidelines given in IS:4326-2005.
- iii) Cantilever method assumptions: The axial force in the column at any floor is linearly proportional to its distance from the centroid of all the columns at that level.
- iv) In order to get maximum support shear in a continuous beam, the minimum load is kept on the spans adjacent to support under consideration and rest of the spans should have maximum load.
- v) Spacing between frames in a multistoried building depends on load acting on a particular story.

**b) Fill in the blanks**

**[2]**

- i) Dead load is computed using IS-----
  - ii) Compressive Strength(Sun dried bricks) = -----
  - iii) Water Pressure  $W_s$ = -----
  - iv) Unit weight of steel, Earth = -----
- c) How would you make brick masonry building earthquake resistant? **[1+1]**
- d) Why shear wall is necessary in a multistoried building of more than 12-15 storeys? **[1]**

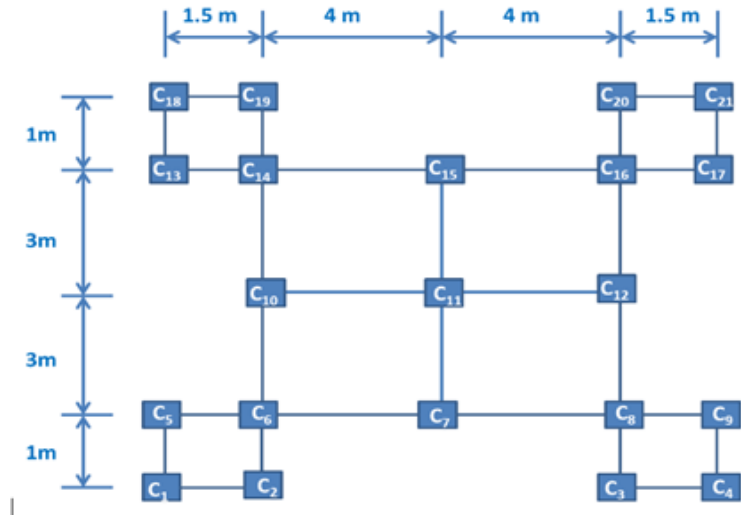
**Q.2 For the given plan layout, find the following design vertical loads:**

**[20]**

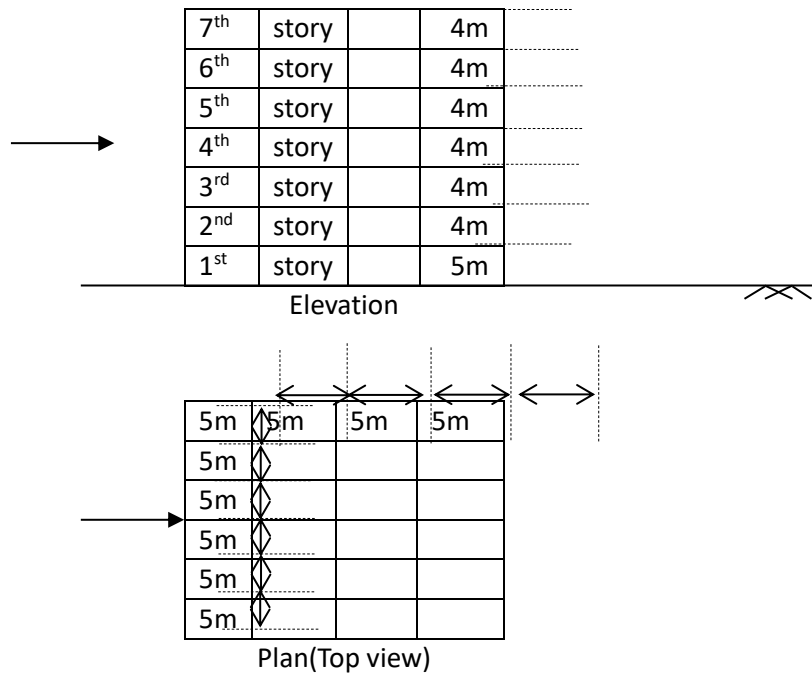
- On external column of 2<sup>nd</sup> floor
- On internal column of 1<sup>st</sup> storey

**Design parameters:**

- Number of stories = 14
- Factored loads on roof: LL = 2.5 kN/m<sup>2</sup>, DL = 3\*storey height kN/m<sup>2</sup>
- Factored loads on floors other than roof: LL = 4.5 kN/m<sup>2</sup>, DL = 6\*storey height kN/m<sup>2</sup>;
- Assume ground floor storey height as h (unitless)
- The **total** load intensity acting on the columns of **ground floor** = 324 kN/m<sup>2</sup>
- Height of 2-5 storey's = h + 0.5
- Height of 6-10 storey's = h + 0.75
- Height of 11-14 storey's = h + 1



**Q.3** For the given design parameters, calculate the wind pressure acting on the building as per IS 875(3):2015. Also draw the pressure diagram. **[16]**



**Design parameters:**

- **Location**-Vadodara
- **Terrain**-Outskirt area with well scattered buildings
- **Class of structure**-Important, design life 100 years
- **Topography**- upwind slope < 3°
- **Cyclonic Region**- Building is post-cyclone importance

**Q.4** Determine using approximate methods the forces acting in the members BD, CD & BH of the Warren portal shown in figure below. **[14]**

**[Use approximate method to find reaction forces/moments and then method of section for finding member forces]**

