

**5E5065**

Roll No. \_\_\_\_\_

Total No of Pages: **4****5E5065****B. Tech. V Sem. (Main/Back) Exam., Nov.-Dec.-2016  
Civil Engineering  
5CE5A Building Design****Time: 3 Hours****Maximum Marks: 80****Min. Passing Marks Main: 26****Min. Passing Marks Back: 24***Instructions to Candidates:*

*Attempt any five questions, selecting one question from each unit. All questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

*Units of quantities used/calculated must be stated clearly.*

*Use of following supporting material is permitted during examination.*

*(Mentioned in form No. 205)*

1. IS: 1893 Part - I2. IS: 875 Part - III**UNIT - I**

- Q.1 (a) Differentiate between the following: [8]  
(i) Rigid frame and Braced frame structures.  
(ii) Gravity load and lateral load resisting members in a building.
- (b) Give short notes on the following: [8]  
(i) Characteristic strength (explain with normal distribution curve)  
(ii) Out rigger braced structures (give typical sketch)

**OR**

- Q.1 Write short notes on following: [4×4=16]  
(a) Shear wall. (b) Tube in tube structures.  
(c) Load flow concept. (d) Symmetry of building.

**UNIT - II**

- Q.2 (a) Define 'solidity ratio' of a framed structures. [2]  
(b) Give the 'pressure coefficient' for the underside surface on the overhang portion of a pitched roof with pitch angle as 15°. [2]

- (c) Define "cliff and Escarpment". [2]
- (d) Calculate the design wind pressure on walls, and at corners of walls of a rectangular clad building with mono-slope roof as shown in figure: 1. [10]
- Plan size =  $10\text{m} \times 16\text{m}$ .
  - Openings in wells = 12% of well area.
  - Terrain category = 2
  - Class of structure = farm building
  - Topography = fairly smooth.
  - Wind Zone = III

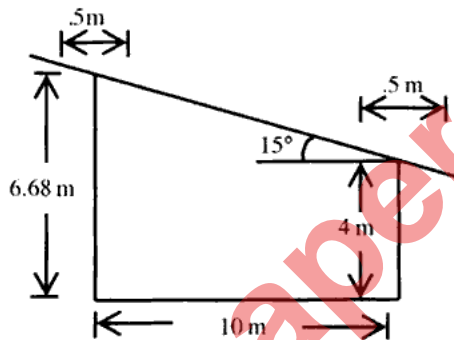


Figure:1

**OR**

- Q.2 For the building shown in Fig: 1 and using data of Q.2(c) above, determine the followings: [rtuonline.com](http://rtuonline.com)
- Design wind pressure on walls (without local pressure) [6]
  - Design wind pressure on different parts of roof (without local pressure) [5]
  - Design wind pressure on overhangs. [5]

### UNIT – III

- Q.3 (a) Give the values of following parameters / coefficients for the given conditions, (mention relevant clause of code) [4×2=8]
- Response reduction factor for steel frame having eccentric bracing.
  - Approximate fundamental natural period of a moment resisting frame building without brick-infill. The height of building is  $12\text{m}$  base dimension  $8\text{m} \times 8\text{m}$ .
  - Zone factor for a building situated in Ahmadabad.

- (iv) Average response acceleration coefficient for "buildings at 'medium soil site' with natural period of 1 sec. (take damping as 5%)
- (b) For the plan of a simple one storey building shown in figure 2, obtain centre of mass and centre of rigidity. Consider stiffness of all the beams and columns same. The net mass of the building is from slab only and as shown in figure: 2 [8]

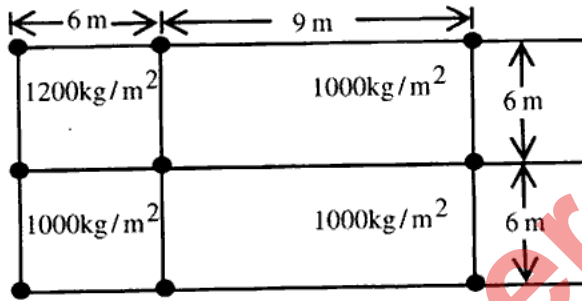


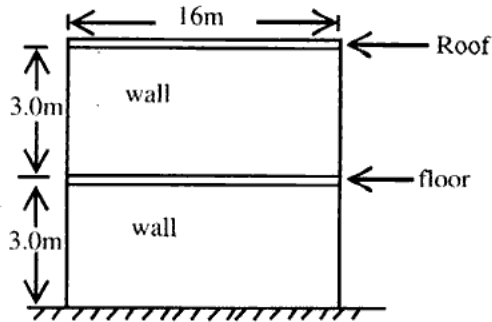
Fig .2 (PLAN)

Stiffness of each frame in X – direction =  $k_x$

Stiffness of each frame in Y – direction =  $k_y$

**OR**

- Q.3 (a) Differentiate between centre of mass and centre of rigidity. With the help of neat sketch explain how does the position of shear walls induce torsion in lateral direction. [6]
- (b) Determine the lateral forces on each floor and base shear for a two storey unreinforced brick masonry ordinary building situated in zone : IV. Consider following data: [10]
- Plan size =  $16\text{m} \times 16\text{m}$
  - Total height of building = 6m i.e. 3m of each storey.
  - Weight of roof =  $2.5 \text{ KN/m}^2$
  - Weight of walls =  $5 \text{ KN/m}^2$   
(Located around the periphery of building on both floor)
  - Live load =  $1.2 \text{ KN/m}^2$  (at roof = zero)
  - Soil type = medium.



### UNIT - IV

- Q.4 (a) Describe the salient features of architectural planning for earthquake resistant contraction. [8]
- (b) Describe the typical failure mechanism of R.C.C. structures during earthquake. [8]

OR

- Q.4 Write short notes on the following: [4×4=16]
- Soft and weak storey.
  - Short column effect.
  - Integrity and ductility in earthquake resistant construction.
  - Give a typical neat sketch of ductile. Detailing at beam-column junction.

### UNIT - V

- Q.5 Differentiate between the following: [4×4=16]
- Flat slab and solid slab.
  - Grid floor and ribbed floor.
  - Folded plate & shell roofs
  - Prefabricated and cast-in situ construction.

OR

- Q.5 (a) Draw a neat typical sketch of a cylindrical shell showing its different parts. Also state the advantages of using shell roofs as compared to flat slabs. [5]
- (b) Differentiate between the membrane theory and beam theory for analyzing the shells. [6]
- (c) Describe the challenges in using the prefabricated construction. [5]