

5E5065

Roll No. _____

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B. Tech V Sem. (Main/Back) Exam. Nov-Dec. 2015

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.

1. IS 1893-Part-I _____

2. IS 875-Part-III _____

UNIT-I

- Q.1 (a) Explain briefly dead and live load for the design of school building. [6]
(b) Define shear walls. Discuss the utility of these walls in a building. [6]
(c) Define strength and stiffness of buildings. Differentiate between soft storey and weak storey. [4]

OR

- Q.1 (a) Describe symmetry and un-symmetry building forms with the help of suitable figures. [6]
(b) Discuss briefly about torsional effects in unsymmetrical buildings. [4]
(c) Explain salient features of Tubular Structural System. [6]

UNIT-II

- Q.2 An industrial rectangular clad building with pitched roof is situated in industrial area on a fairly levelled topography at Jaisalmer. Calculate wind load on wall and roof if

roof angle is 10° and opening in wall may be assumed as 10%. The building is 12 m wide and 22 m long with over hangs on either side as 0.50m. [16]

OR

- Q.2 (a) Differentiate between external pressure coefficient and internal pressure coefficient with proper figure. [4]
- (b) A rectangular building with flat roof supported on masonry walls is situated at Jaipur. The building is having plan dimensions of 14m×56m and height 6m. Calculate wind pressure on wall and roof if the topography of the area is fairly leveled and terrain is with numerous closely spaced obstructions having the size of structure less than 10m in height. Assume 25 openings of 1.2m×1.3m size in the building. [12]

UNIT-III

- Q.3 Calculate total base shear for a four story R.C. framed building to be constructed at Ahmedabad. The proposed building has three bays in X direction and two bays in Y direction as shown in Fig.1 All the beams are of 250mm × 450mm and column of 450mm × 600mm with floor thickness of 120mm. Configuration of building is special moment resisting frame type and 13 resting on rock ground. Assume live load of 4kN/m^2 floor finish of kN/m^2 and Damping coefficient as 5%. [16]

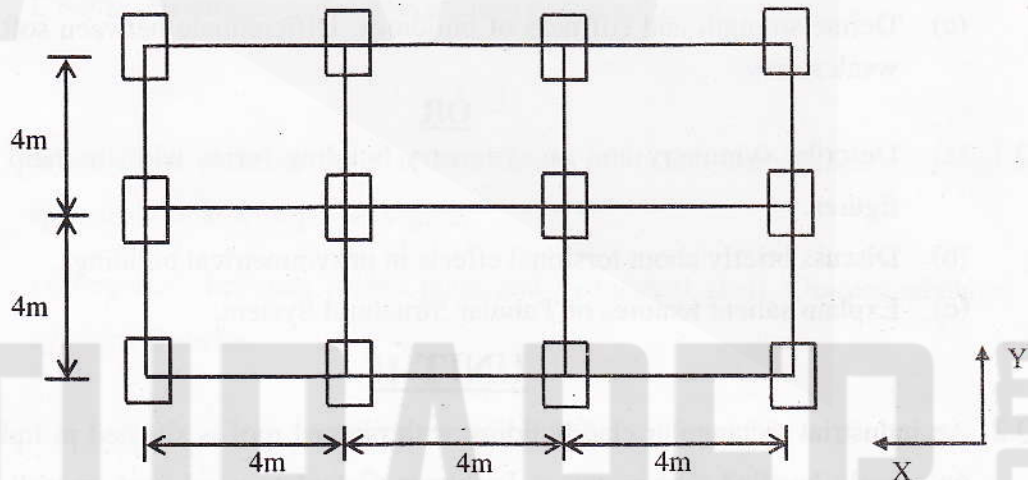


Fig.1

OR

Q.3 (a) A building is built on a plot of $16\text{m} \times 28\text{m}$. Determine the centre of mass, centre of rigidity and design torsional eccentricity in X and Y direction for the building shown in Fig.2. The building is single storeyed and covered with rigid diaphragm roof. Desired data for the building as follows: [12]

- (i) Height of building = 3.5m
- (ii) Thickness of floor and roof slab = 120mm
- (iii) Thickness of wall = 150mm
- (iv) Self weight of roof/slab = 3kN/m^2
- (v) Self weight of wall = 5kN/m^2
- (vi) Relative lateral rigidity of North wall = 0.46
- (vii) Relative lateral rigidity of South wall = 0.55
- (viii) Relative lateral rigidity of East and West walls = 0.50

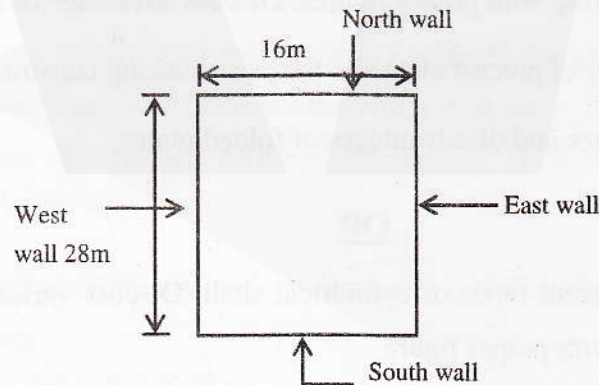


Fig.2

(b) Define torsional moment and torsional force generated in un-symmetrical buildings. Write down expressions for torsional moment and torsional forces. [4]

UNIT-IV

- Q.4 (a) Discuss the importance of ductile detailing of RC structure. Show the ductile detailing of a typical joint of beam and column of a RCC framed building. [8]
- (b) Explain short column effect in R.C. building. [4]
- (c) Write down briefly about floating columns. [4]

OR

- Q.4 (a) Discuss briefly construction practices to be adopted to make a masonry building earthquake resistant. [7]
- (b) Define effective length of masonry wall. Explain the procedure to design a masonry building. [5]
- (c) Discuss various methods to retrofit a masonry building. [4]

UNIT-V

- Q.5 (a) Define Grid flooring with proper figures. Discuss advantage of these floors. [6]
- (b) Explain the utility of precast elements for mass housing construction. [5]
- (c) Discuss advantages and disadvantages of folded plates. [5]

OR

- Q.5 (a) Write down different types of cylindrical shell. Discuss various components of spherical dome with proper figure. [8]
- (b) Differentiate between folded plate and cylindrical shell. Discuss advantage of cylindrical shells. [8]