WSA UNIT WISE ASSIGNMENTS

UNIT-I

Design Loads and Structural System

Q.1: Define Shear walls. Discuss the utility of these walls in a building.

Q.2 Write a short note on shear wall and what are the function of shear wall in a building.

Q.3 What are the symmetry and asymmetry in building explain with neat sketch.

Q.4 What are the various damages in building when subjected to earthquake?

Q.5: Explain salient features of tubular structural system.

UNIT-II

Lateral loads(wind Load)

Q. 1. A rectangular clad building having pitched roof and locate in Jaipur.

Given physical parameters-

Height (h) = 3.5m

Width (W) = 10.0m

Length (l) = 18.0m

Roof angle = 5°

Over Hang = 0.5m

Opening on sides = 10% of all wall area

Ground is flat.

Q.2 Determine the forces per unit area on wall and roof for which these are to be designed.

Analyze a multistory frame building for design wind force and design pressure given with the following parameters

Bays in X direction 4@ 6m c/c

Bays in Y direction 3@5m c/c

Height of each story=3m

Total storey=10

Location= Hyderabad

Category=3

Topography= plane with ($\theta<3°$)

Q.3Calculate wind pressures and design forces on walls and roof of a rectangular clad resort building with pitched roof, having plan dimensions 10m×30m and height 5m, The building is situated in outskirts of Jaipur on a hilltop 10m high having upwind and downwind slopes of 180 and 100, respectively. The building has 16 openings of 1.5m ×1.5m size. The roof is of GC sheeting & the roof angle α is 150. Calculate also the local wind pressures on roof & wall cladding. The columns and trusses are at 5m c/c longitudinally, purlins are at 1.4m c/c and columns at Gable ends are at 5m c/c.

Q.4 What difference will occur if the building in Q.3 situated on a hill having upwind and downwind slopes of 15°and 10°, respectively

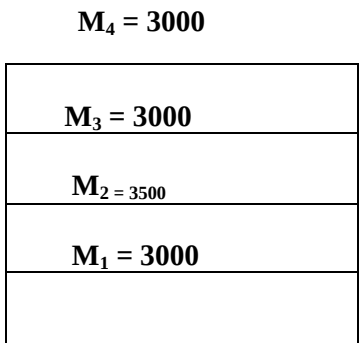
Q.5 Calculate wind pressures and design forces on walls and roof of a rectangular clad building with hipped roof, having plan dimensions 10m×20m and height 5m. The building is situated in Jaipur on a fairly level topography. Walls of building have 20 openings of 1.5m×1.5m size. The roof is of GC sheeting & the roof angle α is 150. Calculate also the local wind pressures on roof & wall cladding. The columns & trusses are at 5m c/c longitudinally, purlins are at 1.4m c/c and columns at Gable ends are at 5m c/c.

UNIT-III

Lateral loads(Earthquake Loads)

Q. 1. A 10 storey OMRF building has plan dimensions as shown in figure. The storey is 3m. Dead Load per unit area of floor consisting of floors, slabs, finishing is 4kN/m^2. Weight of partition of the floor can be assumed to be 2 kN/m^2. The intensity of live load on each floor is 3 kN/m^2. Size of the column and beam is 300 X 600 mm. Soil below the foundation is hard and building is located in delhi. Determine the seismic forces and shear of different floor levels.

Q.2 A 4 storey R.C frame building is shown in figure is situated at jaipur. The height between floors is 3.5 m and total height of building is 14 m. the soil below the foundation in hard lock. Assume building is intended to be used as a hospital. Determine the total base shear as par IS 1893 : 2002 and distributed the base shear along the height of the building.



Q.3 Calculate wind pressures and design forces on walls and roof of a rectangular building having plan dimensions 10m×50m and height 5m,. The building is situated in Mohali (Chandigarh) in an upcoming Institutional complex on a fairly level topography. Walls of building have 20 openings of 1.5m×1.5m size. The building has a flat roof supported on load bearing walls.

Q.4 What difference will occur if the height of building in in Q.2 18m and it is to be used for a cold storage? The structure consists of RC column-beam frame at 5mc/c horizontally and 3m c/c

vertically, supporting the wall. The Building has a flat roof with beams at 5m c/c. The building has 40 openings 1.5 m × 1.5m.

Q.5 : Describe symmetry and asymmetry building forms with the help of suitable figures.

Q.6 : Discuss briefly about torsional effects in unsymmetrical buildings.

UNIT-IV Masonry and Framed Buildings

Q.1: Explain short column effect in R.C. building.

Q.2: Write down briefly about floating columns.

Q.3: Define effective length of masonry wall. Explain the procedure to design a masonry building.

Q.4: Discuss the important of ductile detailing of RC structure. Show the ductile detailing of a typical joint of beam and column and beam-column joint of RCC framed building.

Q.5: Discuss briefly construction practices to be adopted to make a masonry building earthquake resistant.

Q.6: Discuss various methods to retrofit a masonry building.

Q.7: Describe various seismic failure mechanism of stone masonry walls.

Q.8: Describe importance and constructional detail of plinth and lintel band.

Q.9: Write short note on the following:

(i) Ponding of adjacent buildings.

(ii) Soft storey

(iii) Strong Column and weak beam analogy

UNIT-V

Earthquake Resistant Construction

Q.1: Describe the various types of dead loads and imposed loads to be considered for a residential buildings.

Q.2: Differentiate between the “Braced frame” and “Shear walled frame” system. Give neat sketched.

Q.3: Differentiate between the “Centre of mass” and “Centre of rigidity” system. Give neat sketched.

Q.4: Short Note on:-

(i) Overturning of buildings.

(ii) Load distribution system in Slabs.

(iii) Building Configuration system.

(viii) Shell roofs.

Q.5 Why the lower storey of building is designed stronger than upper storey?

Q.6: Define strength and stiffness of buildings. Differentiate between soft storey and weak storey

WSA CO WISE ASSIGNMENTS FOR WEAK STUDENTS

CO-I

Design Loads and Structural System

Q.1: Define Shear walls. Discuss the utility of these walls in a building.

Q.2: Define strength and stiffness of buildings. Differentiate between soft storey and weak storey.

Q.3 Discuss various methods to retrofit a masonry building.

Q.4: Describe importance and constructional detail of plinth and lintel band.

Q.5 Differentiate between the “Braced frame” and “Shear walled frame” system.

CO-II

Lateral loads

Q. 1. A rectangular clad building having pitched roof and locate in Jaipur.

Given physical parameters-

Height (h) = 3.5m

Width (W) = 10.0m

Length (l) = 18.0m

Roof angle = 5°

Over Hang = 0.5m

Opening on sides = 10% of all wall area

Ground is flate.

Determine the forces per unit area on wall and roof for which these are to be designed.

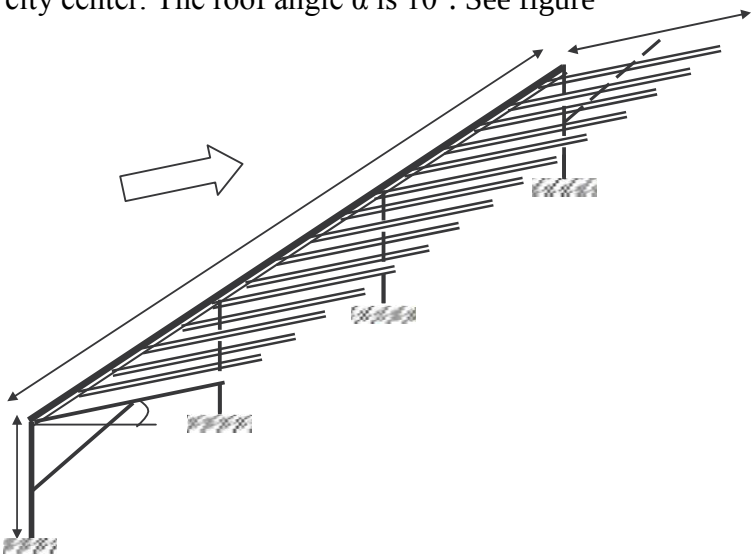
Q.2 Calculate wind pressures and design forces on walls and roof of a rectangular building having plan dimensions 10m×50m and height 5m,. The building is situated in Mohali (Chandigarh) in an upcoming Institutional complex on a fairly level topography. Walls of building have 20 openings of 1.5m×1.5m size. The building has a flat roof supported on load bearing walls.

Q.3 What difference will occur if the height of building in in Q.2 18m and it is to be used for a cold storage? The structure consists of RC column-beam frame at 5mc/c horizontally and 3m c/c vertically, supporting the wall. The Building has a flat roof with beams at 5m c/c. The building has 40 openings 1.5 m × 1.5m.

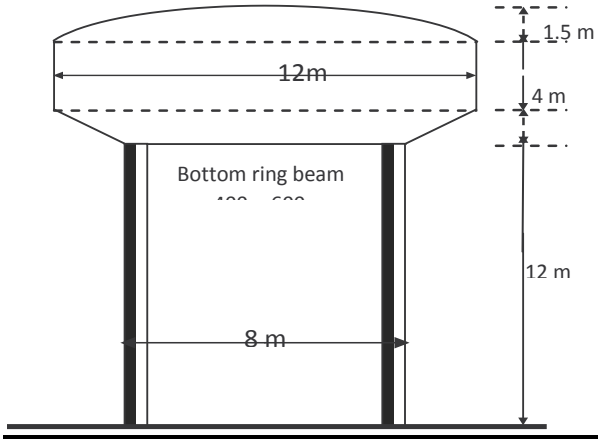
Q.4 Calculate wind pressure and design forces on a free standing duo-pitch roof of an unclad parking shed having dimensions 10m×50m and height of 5m up to eaves. The roof of shed is bent down, The shed is located at Bareilly (UP) in the Transport Nagar area. A facia of 1m has been provided at both the longitudinal walls. The roof angle α is 15^0. Assume that full obstruction can occur on one side i.e. the solidity ratio φ may vary from 0 to 1.0.

Q.5 Calculate wind pressure and design forces on a freestanding mono-slope roof of a canopy having dimensions 5m×20m and height of 3m up to lower eaves. The canopy is located at Agra (UP) near the city center. The roof angle α is 10^0. See figure

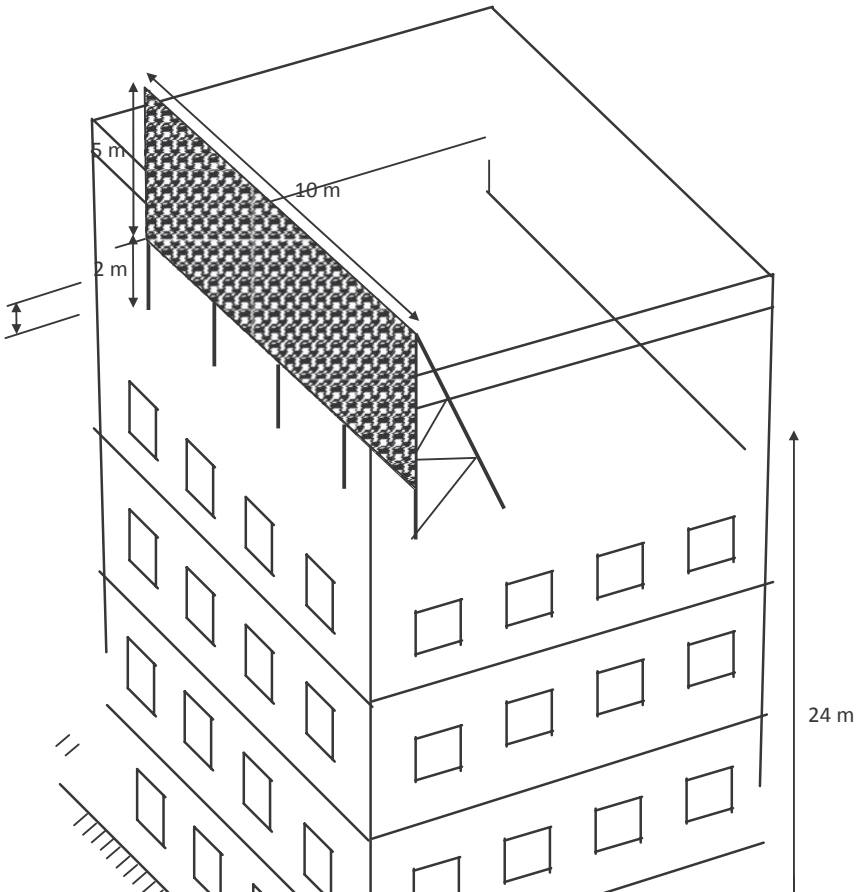
$\theta = 0^o$



Q.6 Calculate design wind pressure on a circular overhead water tank of Intze type, supported on a 12-column staging 12m high, as shown in figure-22.1. The columns are 40 cm dia and the braces 20 cm × 40 cm. The tank is proposed to be constructed in a residential locality of New Delhi



Q.7 Calculate wind pressure and design forces on a hoarding 10m long and 5m high, to be fixed at the roof of a 24m high building near Cannaught Place area in New Delhi. The base of the hoarding board is 2.0m above the roof level. See figure



CO-III

Lateral loads

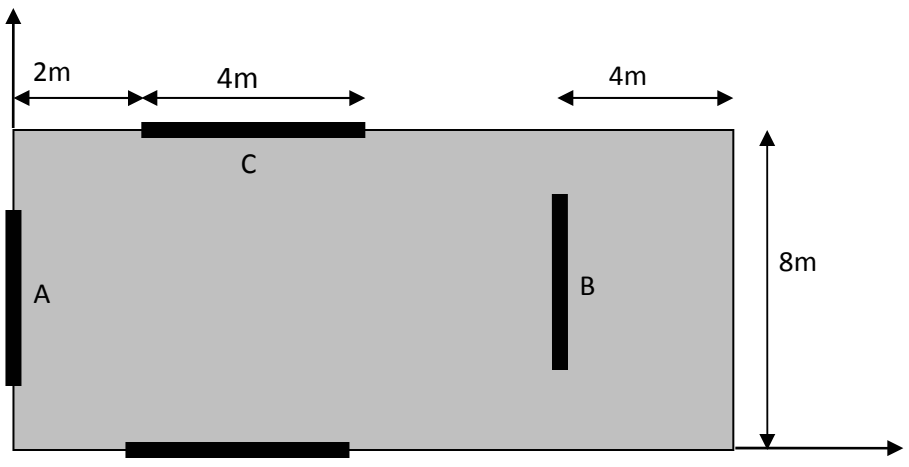
Q. 1. A 10 storey OMRF building has plan dimensions as shown in figure. The storey is 3m. Dead Load per unit area of floor consisting of floors, slabs, finishing is 4kN/m^2. Weight of partition of the floor can be assumed to be 2 kN/m^2. The intensity of live load on each floor is 3 kN/m^2. Size of the column and beam is 300 X 600 mm. Soil below the foundation is hard and building is located in delhi. Determine tha seismic forces and shear of different floor levels.

Q.2 Consider a four-storey reinforced concrete office building .The building is located in Shillong (seismic zone V). The soil conditions are medium stiff and the entire building is supported on a raft foundation. The R. C. frames are infilled with brick-masonry. The lumped weight due to dead loads is 12 kN/m2 on floors and 10 kN/m2 on the roof. The floors are to cater for a live load of 4 kN/m2 on floors and
1.5 kN/m2 on the roof. Determine design seismic load on the structure as per new code.

[Problem adopted from Jain S.K, "A Proposed Draft for IS:1893 Provisions on Seismic Design of Buildings; Part II: Commentary and Examples", Journal of Structural Engineering, Vol.22, No.2, July 1995, pp.73-90]

Q.3 Consider a simple one-storey building having two shear walls in each direction. It has some gravity columns that are not shown. All four walls are in M25 grade concrete, 200 thick and 4 m long. Storey height is 4.5 m. Floor consists of cast-in-situ reinforced concrete. Design shear force on the building is 100 kN in either direction.

Compute design lateral forces on different shear walls using the torsion provisions of 2002 edition of IS 1893 (Part 1).



Q.4 For the building of example 5, compute design lateral forces on different shear walls using the torsion provisions of revised draft code IS 1893 (part 1), i.e., IITK-GSDMA-EQ05-V2.0.

Q.5 A 100 kN equipment is to be installed on the roof of a five storey building in Simla (seismic zone IV). It is attached by four anchored bolts, one at each corner of the equipment, embedded in a concrete slab. Floor to floor height of the building is 3.0 m. except the ground storey which is 4.2 m. Determine the shear and tension demands on the anchored bolts during earthquake shaking.

Q.6 A neon sign board is attached to a 5-storey building in Ahmedabad (seismic zone III). It is attached by two anchors at a height 12.0 m and 8.0 m. From the elastic analysis under design seismic load, it is found that the deflections of upper and lower attachments of the sign board are 35.0 mm and 25.0 mm, respectively. Find the design relative displacement.

CO-IV

Earthquake Resistant Construction

Q.1: Explain short column effect in R.C. building.

Q.2: Write down briefly about floating columns.

Q.3: Discuss the importance of ductile detailing of RC structure. Show the ductile detailing of a typical joint of beam and column and beam-column joint of RCC framed building.

Q.4: Describe various seismic failure mechanism of stone masonry walls.