

Enrollment No: _____ Exam Seat No: _____

C.U.SHAH UNIVERSITY

Summer Examination-2018

Subject Name : Structural Design - II

Subject Code : 4TE08STD1

Branch: B.Tech (Civil)

Semester : 8

Date : 24/04/2018

Time : 02:30 To 05:30

Marks : 70

Instructions:

- (1) Use of Programmable calculator & any other electronic instrument is prohibited.
 - (2) Instructions written on main answer book are strictly to be obeyed.
 - (3) Draw neat diagrams and figures (if necessary) at right places.
 - (4) Assume suitable data if needed.
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Q-1 **Attempt the following questions:** **(14)**

- a) Name the dead loads in a residential building.
- b) Write the application of retaining wall.
- c) Define buttress wall.
- d) What are the methods used for elastic analysis in framed buildings.
- e) What are the important special considerations in design of R.C. tanks?
- f) Enlist the various types of joints in tanks.
- g) List the components of retaining walls.
- h) Enlist the applications of plate girder.
- i) What are the loads acting on gantry girder?
- j) Write any two major components of a industrial buildings.
- k) Enlist the various loads acting on chimneys.
- l) Where are the foot over bridges used?
- m) Enlist the purposes for the use of steel towers.
- n) Define mast in towers.

Attempt any four questions from Q-2 to Q-8

Q-2 **Attempt all questions**

- (a) A multi-storeyed building 20m X 30m plan dimensions. The height of building is 30m, Bay width = 5m in both directions, Storey height = Uniform, **(14)**

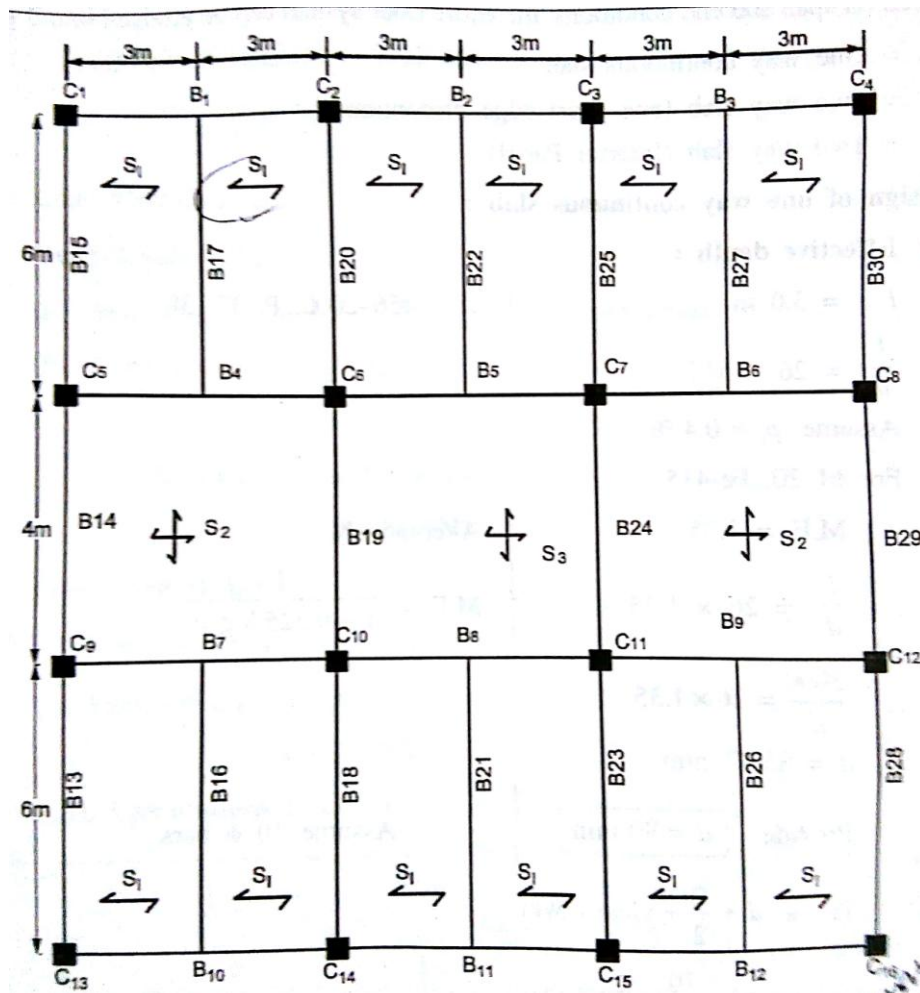


Location= Surat, Category= 3, Topography= plane with upwind slope less than 3° , Life of building= 100 years. Determine the wind loads acting on an internal frame at node points and draw the wind pressure diagram.

Q-3

Attempt all questions

- (a) A typical floor plan of a building is shown below. The following data are, Type of structure: Multi-storey rigid jointed frame, Number of storeys : 4 (G+3), Floor to floor height : 3.35m, Height of plinth : 1.0m above G.L., External wall : 230mm thick including plaster, Internal wall: 150mm thick including plaster, Bearing capacity of soil: 200 kN/m^2 , Imposed load : Roof : Roof finish= 1.5 kN/m^2 , Live load= 1.5 kN/m^2 , Floor : Floor finish= 1.0 kN/m^2 , Live load= 4.0 kN/m^2 , Materials: concrete grade M20 and steel grade Fe 415, Unit weight of concrete= 25 kN/m^3 , Unit weight of masonry= 20 kN/m^3 . Design the slab S1 using limit state method. (10)



- (b) Enumerate the various types of retaining wall and discuss any two types in detail. (4)

Q-4

- (a) Design a rectangular underground tank for a capacity of 80,000 liters. Use M20 concrete and Fe415 grade steel. Take saturated unit weight of soil= 18 kN/m³, density of water= 10 kN/m³ and $\phi = 30^\circ$. (14)

Q-5

Attempt all questions

- (a) A cantilever retaining wall to retain the earth of height 5.5m above lower ground level. Determine the basic dimensions of the retaining wall. Take SBC of soil as 175 kP, $\phi=30^\circ$, $\mu= 0.5$, Unit weight of soil is 18 kN/m³. Use M20 grade of concrete and Fe 415 steel. (10)
- (b) Enlist the various type of water tank and explain any one in detail. (4)

Q-6

Attempt all questions

- (a) Design a gantry Girder (up to section selection). Centre to centre distance between columns (i.e. Span of Gantry Girder)=7.5 m. Crane Capacity=200 kN, Self weight of the crane girder excluding trolley = 200 kN, Self weight of the trolley (crab)= 50 kN, Minimum Hook Approach = 1.2 m, Distance between wheel centre = 3 m, Span of Crane girder= 15 m, Self weight of the rail section = 300 N/m, Wheel base of crane= 3.5m, Yield stress of steel = 250 Mpa. Assume no lateral restrain along the span. (10)
- (b) List various steps involved in the design of a plate girder. (4)

Q-7

Attempt all questions

- (a) A roof truss having slope of 25° is covered with A.C. Trafford sheets @ 127 N/m². Design an unequal single angle purlin if spacing of roof truss is 3.5m and spacing of purlin is 1.6m. Assume self weight of purlin 80 N/m and wind load of 800 N/m². Assume purlins are continuous over the support. (10)
- (b) Explain with neat sketches the different types of truss girders. (4)



Q-8

Attempt all questions

- (a) Explain self supporting steel chimney and guyed steel chimney. (7)
- (b) Discuss the various bracing patterns used in lattice tower with a neat sketch. (7)

