

Enrollment No: \_\_\_\_\_

Exam Seat No: \_\_\_\_\_

# C. U. SHAH UNIVERSITY

## Winter Examination-2019

Subject Name : Structural Design - II

Subject Code : 4TE08STD1

Branch: B.Tech (Civil)

Semester : 8

Date : 01/10/2019

Time : 10:30 To 01:30

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.
- (5) IS 456:2000, IS 800:2007, IS 875:1987 are allowed.

- Q-1**      **Attempt the following questions:**      **(14)**
- a) Draw the followings:      **10**
- 1) Warren truss with vertical member
  - 2) Inclined chord warren truss
  - 3) Pratt truss with inclined chords
  - 4) Double warren truss
  - 5) K-truss
  - 6) Z-truss
  - 7) XB-bracing
  - 8) Arch-bracing
  - 9) W-bracing
  - 10) Y-bracing
- b) Give two advantages of plate girder over trusses.      **01**
- c) Give two disadvantages of plate girder.      **01**
- d) Give two applications of foot over bridge.      **01**
- e) Find basic wind speed for Chennai.      **01**

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

- Q-2**      **Attempt all questions**      **(14)**
- (a) Calculate dead load (DL) and live load (LL) for purlin spaced at 1.8m on the rafter inclined at 25°. The purlin supports 1.6 mm thick class-I type GI sheet and truss spacing is 3.5m.      **07**
- (b) Enlist and explain various loads acting on chimneys.      **07**
- Q-3**      **Attempt all questions**      **(14)**
- The roof of a workshop 20m long and 12m wide between centers of column is supported by a fixed base R.C portal frame spaced at 4m apart. The height of the column from top of footing up to the center of beam is 6m. The column are laterally braced at a height of 2m above plinth level. Design the roof slab for the following additional data:      **14**
- Live load (LL)      :0.75 KN/m<sup>2</sup>



Floor finish (FF)	:2.25 KN/m <sup>2</sup>
Depth of foundation	:1.4m below G.L
Width of the beam	:230 mm
Soil bearing capacity (SBC)	:400 KN/m <sup>2</sup>
Concrete grade	:M 20
Steel grade	:Fe415
Exposure condition	:Mild environment
Design assumption	:All members of the frame are rigid jointed.

- Q-4 Attempt all questions (14)**  
 Design a welded plate girder for a simply supported bridge deck beam with clear span 24m, subjected to dead load 20 KN/m not including self-weight, live load 10 KN/m and two concentrated load of 200 KN each at 6 m from each end.  
 Assume that the top compression flange of plate girder is restrained laterally and prevented from rotating. Design the plate girder with intermediate stiffener utilizing tension field action. **14**
- Q-5 Attempt all questions (14)**  
 (a) Classify the various joints used in water tank and explain each type of joint with neat sketch. **10**  
 (b) Draw the earth pressure diagram for partial submerged backfill. **04**
- Q-6 Attempt all questions (14)**  
 (a) Write down the design steps of Gantry girder. **10**  
 (b) Describe the limiting deflection criteria at mid span for four wheel of gantry girder. **04**
- Q-7 Attempt all questions (14)**  
 (a) In the design of retaining wall to retain the earth upto 4m high. The top surface is horizontal behind the wall. The soil behind the wall is a well drained medium dense sand with following properties:  
 Unit weight = 17 kN/m<sup>3</sup>  
 Angle of internal friction  $\phi = 30^\circ$   
 The material under wall base is the same as above with a safe bearing capacity of 150 kN/m<sup>2</sup>. The coefficient of friction base and soil is 0.55. Design the wall using M20 grade concrete and HYSD reinforcement of grade FE 415. Compute all the required parameter for designing stem of retaining wall. **10**  
 (b) Explain the deck type and through type truss bridge with neat sketch. **04**
- Q-8 Attempt all questions (14)**  
 (a) Design the stem of retaining wall for data given in Q-7 (a). **06**  
 (b) Design the Heel and Toe of retaining wall for data given in Q-7 (a). **08**

