Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– VIII EXAMINATION – SUMMER 2015

Subject Code: 180604 **Date:07/05/2015**

Subject Name: STRUCTURAL DESIGN-II

Time:10.30AM-01.30PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Use of IS:800, IS:875,IS:456,IS:3370,SP-16 and steel table is permitted.**
5. **Material is M20 grade concrete and Fe 415 Steel for RCC and f_y=250 Mpa for steel if not specified.**

Q.1 (a) A cantilever retaining wall is designed to retain the earth 5 m high behind the wall. The unit weight of soil is 18 kN/m^3 and angle of internal friction is 22^0. The bearing capacity of soil is 130 kN/m^2 and coefficient of friction between base and soil is 0.4. Use M20 – Fe 415. Assume depth of foundation is as 1.0 m. Fix the dimension of retaining wall and design only stem. Also carry out stability checks. **14**

Q.2 (a) A fifteen storied building in Ahmedabad on plane ground has 6 bay of 4m in length and 4 bay of 5m in width. Height of each storey is 3.0 m. Plot wind pressure diagram as per provisions of to IS:875(part-III). **07**

(b) Design bearing stiffener at support for plate girder designed in Q.3(or) **07**

OR

(b) Elaborate the various types of stiffeners with respective codal provisions **07**

Q.3 (a) Fix the basic dimensions of Intz type container of an elevated water tank to store 6.0 lacs liter of water and design the top ring beam. **07**

(b) Design a rectangular tank for the following data. Length of tank=6 m, width of tank=4m & Depth of water= 3.5 m. The tank rests on ground. The wall and base slab are not monolithic. **07**

OR

Q.3 (a) A simply supported welded plate girder of span 24 m is subjected to service load of 50kN/m UDL and two fixed point loads of 240 kN each spaced at 7 m from each supports. Design the plate girder cross section using the fy 250 steel plates. Perform all required checks for cross section as per IS code provisions. Apply curtailment of flanges. **14**

Q.4 (a) A foot over bridge is of span 16m and pedestrian load of 3 kN/m^2. The clear distance between two trusses is 3.2m and truss height is 2.0m. Take dead weight of truss is 1.1kN/m. Assume suitable configuration of truss. Design & detail a cross beam and a horizontal memberat support. **14**

OR

Q.4 (a) A gantry girder of 7.0m span is to be designed for crane capacity of 300 kN. The effective span of crane girder is 18m. Weight of crane girder excluding crab is 180 kN and weight of crab is 50 kN. Take clearance as 1.1m and wheel base as 3.2m. Choose suitable section and check the bending stresses and deflection. **14**

Q.5 (a) Roofing system of an industrial shed consists of howetrusses spaced at 4.0 m apart. The span of roof truss is18 m and rise is 3 m. The level of eaves is 8.0 m **14**

above the ground. Assume suitable configuration of truss. Design the continuous angle purlin of truss only. The shade is situated on flat terrain with lightly populated buildings. The shed has less than 3% permeability.

OR

Q.5 (a) Prepare a typical structural lay out for G+3 storey building having 4 bays of 4 m in X –direction and 5 bays of 3 m in Y-direction. Prepare structural layout and plot load distribution diagrams for typical floor. Design and detail a typical continuous beam of the chosen building. **14**

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