Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VIII EXAMINATION – WINTER 2015

Subject Code: 180604 **Date:16/12/2015**

Subject Name: Structural Design-II

Time:2:30pm to 5:30pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Use of IS:800, IS:875,IS:456,IS:3370,SP-16 and steel table is permitted.**
3. **Make suitable assumptions wherever necessary.**
4. **Figures to the right indicate full marks.**

Q.1 (a) A retaining wall is to be design to retain horizontal earth fill of 3.5 m height. Workout the dimension for various components, provide necessary stability checks and design either stem or heel slab. Furnish the reinforcement detailing. Consider following design data. 14

(i) Unit weight of soil :17 kN/m^3
(ii) Angle of internal friction of soil : 30º.
(iii) Safe bearing capacity of soil strata: 175 kN/m^2
(iv) Coefficient of friction between base and soil : 0.55

Use M20 concrete and Fe 415 steel

Q.2 (a) A G+3 storey RCC framed building for the shopping centre is to be design for 20 m x 7.5 m clear room area at each floor. Prepare structural layout showing position and orientation of columns, beams and slab. Design any one component from the following and furnish reinforcement detailing. 07

(i) Any one beam of typical floor (ii) any one column

Take floor height 3.0 m and consider walls are of 230 mm thick brick masonry

(b) A five storey framed building is situated in Bhuj city on a plane a ground. It has 4 bays of 5m each along each direction with total 25 columns. Height of each storey is 3.5m.Estimate nodal wind forces on an interior frame as per IS provisions. 07

OR

(b) A steel tower is to be design for power transmission line. Enlist various loads to be considered for the design and discuss about critical loading conditions. 07

Q.3 (a) A steel foot over bridge at railway junction is to be design for 24 m span with 4.0 m width. Prepare structural layout and design one cross beam and top chord member near middle of the span. 14

OR

Q.3 (a) A simply supported welded plate girder of span 24 m is to be design to carry uniformly distributed service load of 50 kN/m along with two point loads each of 240 kN acting at 8.0 m from each supports. Design and detail the cross section of the girder for the critical moment. Provide all required checks as per IS provisions. Workout locations for the flange curtailment. 14

Q.4 (a) Design an appropriate section for a gantry girder for the following requirements. 14

(i) Span of the gantry girder : 6 m
(ii) Span of the crane : 20 m
(iii) Crane capacity : 240 kN
(iv) Self weight of the crane girder : 10 kN/m
(v) Self weight of the crab : 50 kN
(vi) Minimum hook approach = 1.00 m
(vii) Wheel base of crane = 3.0 m

Provide checks for Bending Moment and deflection only

OR

Q.4	(a)	Prepare structural layout of industrial steel shed 36 m x 18 m x 7 m (length x width x height) to be constructed at GIDC Ahmedabad,showing position of columns, trusses, braces, and gantry. Show the truss configuration and workout nodal wind forces on the truss. Also design the intermediate purlin.	14
Q.5	(a)	An underground rectangular RCC water tank with clear plan dimensions 6 m x 4 m is to be design for 60000 litre capacity. Consider top edges of walls free. Design all elements and furnish reinforcement detailing.	14

OR

Q.5	(a)	An intz shaped elevated water tank of 25 m height is to be design to for 4.5 lacs litre capacity. Work out the dimensions of container and design roof, top ring beam and wall. Furnish reinforcement detailing.	14