Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER–VIII • EXAMINATION – SUMMER • 2015

Subject code: X-80602 **Date: 11/05/2015**
Subject Name: Structural Design-II
Time: 10:30 am - 01:00 pm **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 456:2000, IS 875 (Part I,II,II), IS 3370 (Part I,II,III,IV) and SP-16 is allowed.**
5. **Use M-20 grade concrete and Fe-415 grade steel if not mentioned.**

Q.1 **(a)** A G+9 storey building having 6 bays at 5 m spacing in one direction and 10 bays at 3.5 m spacing in the perpendicular direction is situated on a hill near Bhuj with upwind slope of 8°. The storey height is 3 m. The height of crest point from mean ground level is 600 m. The building is located at 150 m on the upwind side from the crest point. Showing the variation of wind pressure, calculate the nodal forces due to wind in both directions. **14**

Q.2 **(a)** Explain Limit state method and working stress method in detail. **07**

(b) Explain stability criteria of retaining wall in detail. **07**

OR

(b) Explain significance of shear key and weep holes in retaining wall. **07**

Q.3 Calculate preliminary sizes of all the components of a retaining wall to retain 7.5 m earth above ground level. The unit wt of soil is 17 kN/m^3, Angle of Repose is 30^0, Coefficient of friction between soil and concrete is 0.57, SBC of soil is 180 kPa. Show stability checks. Design stem and toe. **14**

OR

Q.3 Design a retaining wall to retain 5 m earth above ground level. The unit weight of backfill, angle of internal friction, coefficient of friction and soil bearing capacity are 16 kN/m^3, 30°, 0.62 and 180 kPa respectively. Show stability checks and design all components. **14**

Q.4 Design and show reinforcement detail for an under-ground circular tank considering following data. Capacity = 5 Lac Litre. Unit Wt. soil = 16 kN/m^3. Unit wt. of water = 10 kN/m^3 Use M-30 grade concrete and Fe-415 grade steel.The wall and base slabare not monolithic. Water table is high up to ground level. **14**

OR

Q.4 Design and detail the flat slab interior panel with 4 m x 3 m dimensions. The slab carries live load of 3.5 kPa and floor finish of 1.2 kPa. The square columns are 0.4 m size. **14**

Q.5 Design and detail a slab type rectangular combined footing to support the columns carrying 800 kN and 1200 kN at 4 m spacing. Their square column sizes are 450 mm and 500 mm respectively. The SBC of soil is 250 kPa and width of footing is 2 m. **14**

OR

Q.5 Design and show reinforcement detail a Rectangular on ground water tank for the capacity of 4 Lac Litre. Use M-30 grade concrete and Fe-415 grade steel. **14**