

GUJARAT TECHNOLOGICAL UNIVERSITY**PDDC - SEMESTER-VIII EXAMINATION – SUMMER 2016****Subject Code: X80602****Date: 12/05/2016****Subject Name: Structural Design-II****Time: 10:30 AM TO 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,III), 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 12 storey building having 6 bays at 4 m spacing in one direction and 10 bays at 5 m spacing in the perpendicular direction is situated on a hill near Vadodara with upwind slope of 8° . The storey height is 3.5 m. The height of crest point from mean ground level is 800 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 significance of shear key and weep holes in retaining wall. **07**
- Q.2(b)** Explain various types of retaining walls with their significance. **07**
- OR**
- Q.2(b)** Explain significance of cracked and un-cracked sections in design of water tanks. **07**
- Q.3** Calculate preliminary sizes of all the components of a counter-fort type retaining wall to retain 7 m earth above ground level. The unit weight of soil is 17 kN/m^3 , Angle of Repose is 30° , Coefficient of friction between soil and concrete is 0.57, SBC of soil is 180 kPa. Show stability checks. Design the stem and counter-fort. **14**
- OR**
- Q.3** A retaining wall has to retain 4 m earth above ground level. The unit weight of soil is 18 kN/m^3 , Angle of Repose is 30° , Coefficient of friction between soil and concrete is 0.60, SBC of soil is 150 kPa. Show stability checks. Design the stem and heel. **14**
- Q.4** Design an under-ground circular tank for capacity of 5 Lac Liter. Unit weight of soil is 16 kN/m^3 and unit weight of water is 10 kN/m^3 . Use M-30 grade concrete and Fe-415 grade steel. The wall and base slab are not monolithic. Water table is high up to ground level. Use IS-3370 method for design. **14**
- OR**
- Q.4** Design and detail the flat slab interior panel of size 4.2 m x 3.2 m. The slab carries live load of 4 kN/m^2 and floor finish of 1 kN/m^2 . The size of column is 450 mm x 450 mm. The slab is without drop and column is without capital (column head). **14**
- Q.5** Design a slab type rectangular combined footing to support the columns carrying 800 kN and 1200 kN load 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 for a Rectangular on ground water tank for the capacity of 4 Lac Liter. Use M-30 grade concrete and Fe-415 grade steel. Use IS-3370 method for design. **14**