Seat No.: _____ Enrolment No._____

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,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 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 30^0, 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 30^0, 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**

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