Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER–VIII • EXAMINATION – SUMMER 2013

Subject Code: X-80602 **Date: 13-05-2013**

Subject Name: Structural Design-II

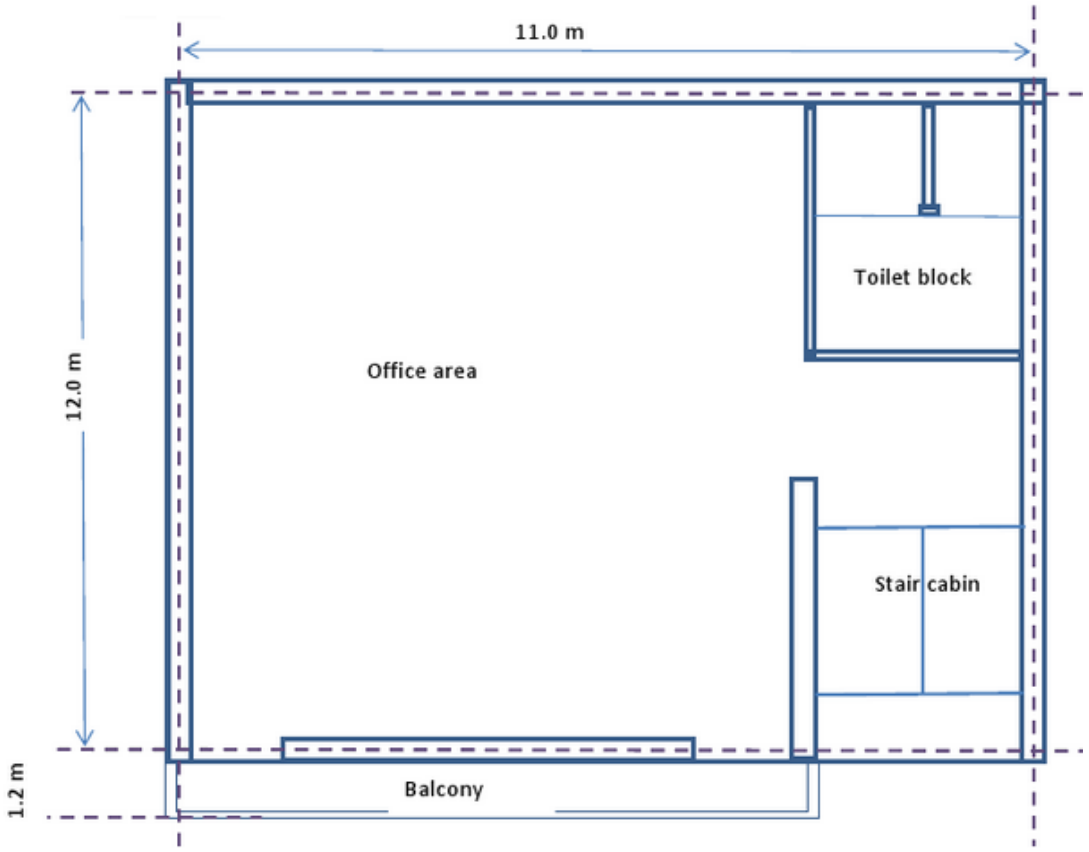
Time: 10.30 pm - 01.00 pm **Total Marks: 70**

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 12 storied building having 8 bays at 3 m spacing in one direction and 10 bays at 4 m spacing in orthogonal direction is situated on a hill near Bhopal with upwind slope of 8° and factor s = 0.15. The storey height is 3.2 m. 1.2 m parapet is provided at top. Showing the variation of wind pressure, calculate the nodal forces due to wind in both directions, **14**

Q.2 (a) Prepare a structural layout showing location of beams, columns & slabs with their tentitive sizes for the building as shown in figure. Assume suitable dimensions for stair case and toilet block. **07**



(b) Explain Limit state method and working stress method in detail. **07**

OR

(b) Define retaining wall. Explain various types of retaining wall in detail. **07**

Q.3 Design a counterfort type retaining wall to retain 7 m earth above ground level. The unit weight of backfill, angle of internal friction, coefficient of friction, spacing of counterforts and soil bearing capacity are 18 kN/m^3, 30°, 0.62, 3.0 m and 200 kPa respectively. Design stem and toe only. **14**

OR

Q.3 Design a Cantilever type 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. **14**

Q.4 Design and show reinforcement detail for an under-ground circular tank considering following data. Diameter of tank= 7 m. Depth of water= 4.75 m. Unit Wt. soil = 16 kN/m^3. Unit we. 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 4.8 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 900 kN and 1.1 MN 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 160 kPa. **14**

OR

Q.5 Design and show reinforcement detail a Rectangular on ground water tank for the capacity of 2 Lac Liter. Use M-30 grade concrete and Fe-415 grade steel. **14**

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