Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER-1 (NEW) EXAMINATION – WINTER 2016

Subject Code: 2712008 **Date:05/01/2017**

Subject Name: Advanced Design of Concrete Structures

Time: 2:30 pm to 5:00 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 M20 grade of concrete and Fe415 grade of steel, until otherwise stated.**
5. **Use of IS 456, IS 1893, IS 3370, IS 875 and SP 16 are permitted.**
6. **Assume unit weight of RCC 25 kN/m^3 and masonry 20 kN/m^3.**
7. **Draw neat and clean figure with pencil only.**

Q.1 An interior flat slab panel is having c/c dimension of 10 m x 10 m. The flat slab is rested on circular column RCC having diameter 900 mm. Design this flat slab considering the Drop and Column head. Consider L.L = 4 kN/m^2 and F.F=1.4 kN/m^2. Perform all necessary checks for the safety. **14**

Q.2 (a) Design a conical roof over a 20 m diameter hall with a rise of 2.5 m. Assume L.L= 3.0 kN/m^2. The dome is supported on 450 mm wide continuous support on periphery. **07**

(b) Draw the figure for bunker with typical reinforcement detail with necessary cross sections also. **07**

OR

(b) State and explain the assumption and limitations made in the IS method of design of flat slab. **07**

Q.3 A grid floor has 170 mm thick slab, floor finish =1.6 kN/m^2 , live load 4 kN/m^2 is provided for a hall with overall dimensions of 20 m x 20 m c/c with wall on outer periphery only and 4 interior beams in both direction. Assume all beams of size 400 x1400mm (including slab thickness). Calculate the bending moment, torsional moment and shear force at a beam junction of hall. Also design reinforcement in side beam of 20 m long. Use IS code method only. **14**

OR

Q.3 A raft foundation of total size 25 m X 25 m is provided for 16 columns with equal distance c/c along both direction and 2 m projection of slab on all sides. Assume working load on interior column 6500 kN and on all other columns 2500 kN. Analyze the periphery beam. **14**

Q.4 The supporting shaft of an Intze water tank is 4 m internal diameter and 250 mm thick. Design the reinforcement and verify all the necessary checks in the shaft for combination of working axial load of 4000 kN & working bending moment 600 kNm for dead load and wind load combination. **14**

OR

Q.4 A column of size 600 mm x 700 mm carrying Pu =3500 kN, Mux= 450 kNm, Muy= 220 kNm is supported by a pile cap 1600 mm thick resting on 6 piles (of 650 mm Diameter each) at 1000 mm c/c. Design the reinforcement in pile cap and calculate maximum pile load. **14**

Q.5 Design a silo wall of 350 mm thick to resist moment of 75 kNm. Perform all necessary checks. **14**

OR

Q.5 A folded plate floor has all plates making an angle of 45^0 with horizontal and casted so that vertical depth of folded plate is 1.6 m. Design reinforcement in plate to carry L.L = 3.2 kN/m^2. Assume plate thickness 130 mm and simply supported span of 10 meter. Perform all necessary checks. **14**

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