Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER–I(New course)• EXAMINATION – WINTER- 2015

Subject Code: 2712008 **Date: 02/01/2016**

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 of IS 456, IS 1893, IS 3370, IS 875 and SP 16 are permitted.**
5. **Use M20 grade of concrete and Fe415 grade of steel, until otherwise stated.**
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 x 10 m. The flat slab is rested on circular column RCC having diameter 750 mm. Design this flat slab considering the Drop and Column head. Consider L.L = 5.2 kN/m^2 and F.F=1.1 kN/m^2. Perform all necessary checks for the safety.	**14**
Q.2	**(a)**	Draw the figure for silo with typical reinforcement detail with necessary cross sections also.	**07**
	(b)	Design a conical roof over a 20 m diameter hall with a rise of 3.6 m. Assume L.L= 2.7 kN/m^2. The dome is supported on 450 mm wide continuous support on periphery.	**07**
		OR	
	(b)	Elaborate the serviceability criteria for reinforced concrete structure element for both beam and column.	**07**
Q.3		Design a bunker wall of 300 mm thick to resist moment of 50 kNm. Perform all necessary checks.	**14**
		OR	
Q.3		The supporting shaft of an Intze water tank is 3.4 m internal diameter and 300 mm thick. Design the reinforcement and verify all the necessary checks in the shaft for combination of working axial load of 6000 kN & working bending moment 800 kNm for dead load and wind load combination.	**14**
Q.4		A column of size 450 mm x 750 mm carrying Pu =4000 kN, Mux= 590 kNm, Muy= 150 kNm is supported by a pile cap 1500 mm thick resting on 6 piles (of 750 mm Diameter each) at 1400 mm c/c. Design the reinforcement in pile cap and calculate maximum pile load.	**14**
		OR	
Q.4		A grid floor has 140 mm thick slab, floor finish =1.4 kN/m^2 , live load 3.9 kN/m^2 is provided for a hall with overall dimensions of 30 m x 30 m c/c with wall on outer periphery only and 6 interior beams in both direction. Assume all beams of size 350 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 30 m long. Use IS code method only.	**14**

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 14 meter. Perform all necessary checks. **14**

OR

Q.5 A raft foundation of total size 24 m X 24 m is provided for 12 columns with equal distance c/c along both direction and 2.5 m projection of slab on all sides. Assume working load on interior column 8000 kN & on all other columns 1800 kN. Analyze the periphery beam. **14**

****