Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER– I• EXAMINATION – WINTER 2014

Subject Code: 2712008 Date:09/01/ 2015

Subject Name: Advanced Design of Concrete Structures

Time:02:30 p.m. to 05:00 p.m. 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.**

Q.1		The supporting shaft of an Intze water tank is 3 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 6500 kN & working bending moment 1000 kNm for dead load and wind load combination.	**14**
Q.2	**(a)**	Explain the serviceability criteria for reinforced concrete structure element for both beam and column.	**07**
	(b)	A spherical dome having a span of 18m central rise of 3m and has thickness of 200mm, floor finish 1.2 kN/m^2. Design bottom ring beam of 320mm width and supported through out with masonry wall. Assume no live load acting in this system.	**07**
		OR	
	(b)	Design a conical roof over a 15 m diameter hall with a rise of 3 m. Assume L.L= 2.5 kN/m^2. The dome is supported on 400 mm wide continuous support on periphery.	**07**
Q.3		Design an interior FLAT slab panel having c/c dimension of 8.0 x 8.0 m. The flat slab is rested on circular column RCC having diameter 650 mm. Consider that Drops and Column heads are provided in the design. Consider L.L = 5.5 kN/m^2 and F.F=1.0 kN/m^2. Perform all necessary checks for the safety. Sketch the design also.	**14**
		OR	
Q.3		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 1.5 m. Design reinforcement in plate to carry L.L = 3 kN/m^2. Assume plate thickness 110 mm and simply supported span of 12 meter. Perform all necessary checks. Sketch the design also.	**14**
Q.4		A grid floor has 120 mm thick slab, floor finish =1.2 kN/m^2 , live load 3.8 kN/m^2 is provided for a hall with overall dimensions of 24 m x 24 m c/c with wall on outer periphery only and 5 interior beams in both direction forming a slab panel of size 4m x 4m. Assume all beams of size 300 x1200mm (including slab thickness). Calculate the bending moment, torsional moment and shear force at a beam junction of hall. Also design reinforcement in central beam of 24 m long. Use IS code method only.	**14**
		OR	
Q.4	**(a)**	Design a bunker wall of 250 mm thick to resist moment of 33 kNm. Perform all necessary checks.	**10**

(b) Explain how the analysis of bunker wall and silo wall are differing. **04**

Q.5 A raft foundation of total size 20 m X 20 m is provided for 12 columns with equal distance c/c along both direction and 2.0 m projection of slab on all sides. Assume working load on interior column 7200 kN & on all other columns 2800 kN. Analyze the periphery beam. **14**

OR

Q.5 A column of size 400 mm x 750 mm carrying Pu =3500 kN, Mux= 500 kNm, Muy= 120 kNm is supported by a pile cap 1400 mm thick resting on 4 piles (of 750 mm Diameter each) at 1600 mm c/c. Design the reinforcement in pile cap and calculate maximum pile load. **14**

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